£2,000 OF ACT PRIZES WIN 3 APRICOT F1ES

YOUR COMPUTER

Denmark	DKr.	36.00
France	Fr.	52.50
Germany	DM.	9.50
Greece	Dra.	310.00
Holland	DFl	8.90
Italy	L	4300
New Zealand	NZ$	3.70
Singapore	MS	7.20
Spain	Pts.	400.00
Switzerland	SFr.	7.50

£1

JULY 1985 BRITAIN'S BIGGEST-SELLING HOME COMPUTER MAGAZINE Vol. 5 No. 7

HOW BRITISH ADVENTURE WRITERS BEAT THE YANKS AT THEIR OWN GAME

ATARI ST v. APRICOT F1E Battle of the supermicros

Spectrum Backboogie, Ramdisc and Waves

Amstrad Back-up and Space Eggs

CBM-64 Move Screen and BBC Beebski Beat

Plus BBC/ Electron Jump Jet and CBM-64 Death Trap

WHICH TV MONITOR IS THE BEST?

DOUGHBOY

synsoft

The bugle has sounded.

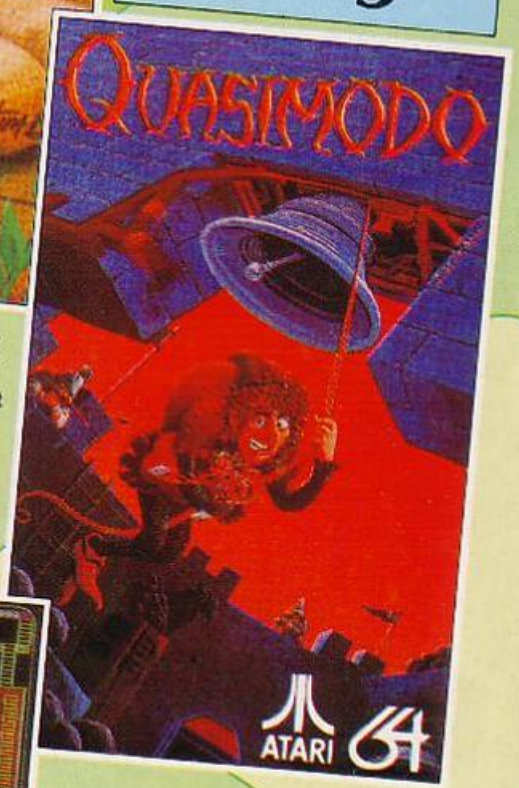
It's time to hit the trenches for a fun filled contest of bravery and tactics.

Your mission: recover the supplies that are scattered across the playfield while avoiding enemy troops trying to do exactly the same thing.

You've got rocks, trees and trenches to shelter you from fire, but only your speed, and wits can protect you on the long open stretches you must cross.
And there are the mortars. . .

Doughboy™ will give you hours of excitement trying to out-wit some of the cleverest opponents your computer can throw at you!

DISK £14.95
CASSETTE £9.95

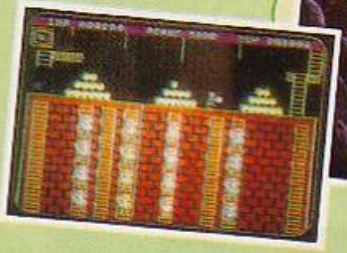


Quasimodo likes bells. They make him feel good – they make him happy – they are his friends. All Quasi wants is to be left alone, but those nasty soldiers think that he stole the royal jewels. Quasi didn't steal them!
Quasi wants the soldiers to leave him alone. They fire arrows at him. Quasi doesn't want to, but Quasi will throw big rocks at the soldiers.
Quasi knows a secret! Quasi knows where the jewels have been hidden in the castle and only Quasi can climb there!
Now the noise has stirred up the bats in the belfry. Quasi better jump away from those bats!
Quasi think he got up on the wrong side of bed today.

U.S. GOLD
All American Software

ocean
A U.S. GOLD/OCEAN JOINT PRODUCTION

U.S. Gold Limited
Unit 10, Parkway
Industrial Centre
Heneage Street
Birmingham B7 4LY
Telephone: 021-359 8881
Telex: 337268



YOUR COMPUTER Contents

JULY 1985

Atari 520ST review: page 40.

ACT FIE: page 47 for review and page 85 for competition.

Jump Jet Assault: page 52.

Cover shot — Brits beat Yanks in adventure writing: page 36.

12 NEWS: MSX II; Oric rescue; Sinclair latest.

17 LETTERS: Maxam vindicated; A headmaster writes; Hackers.

21 FIRST BYTES: Handy peeks and pokes to get beginners animated; stuff you need to know to get into the modem mode; programing snobbery.

25 HARDWARE HITLIST: As real live tortoises get more and more expensive why not get a turtle? We coax Valiant out of its shell. Also Star printers.

27 SOFTWARE SHORTLIST: Programs for softies; with the flower fairies in Elidon, chewing chocolate with Charlie, and the cut--price clockwork toy massacre.

35 QUEST CORNER: Keys of Hope Tyrann and Mindshadow. New adventure releases reviewed by Hugo North.

36 HOW BRITISH ADVENTURE WRITERS BEAT THE YANKS AT THEIR OWN GAME: James Hartley flies the flag for British software houses.

40 BATTLE OF THE SUPERMICROS: Kathleen Peel unmasks the Atari 520 ST. This year's model or a computer for a generation?

47 FIRST BITE OF THE APRICOT: The Apricot F-1E; dinosaur or dream machine? Elsie Dee assesses the fruits of experience.

48 TELEVISION MONITORS: Square-eyed Luke Theodossiou adjusts his horizontal hold and tunes in to find out which monitors will cut your Optrex bills

50 COMPETITION RESULTS: Who won the Atari competition.

52 BBC/ELECTRON, JUMP JET ASSAULT: A viff with Brian Lewis.

56 SPECTRUM BACKBOOGIE: This little number by Timothy Clos will repeatedly play a piece of music without interfering with the running of your own programs.

58 BBC BEEBSKI BEAT: Fintan Culwin produces simple interrupt driven tunes to accompany your games. Part of a series.

64 AMSTRAD CPC-464 SPACE EGGS: A colourful asteroidesque game which gives a whole range of colours and provides mode 0 size text by Christopher Leigh.

68 SPECTRUM RAMDISC: Ro Richardson lets you load and save program and code very fast without any extra hardware.

70 BBC DATABASES: John Dawson disseminates information.

72 SPECTRUM TO THE TOP: Julian Wood and the smooth-scrolling graphics.

76 COMMODORE 64 DEATH TRAP: The seconds are ticking away. Can you defuse the suspect devices? A real nerve-tingler from Richard Hamer.

81 SPECTRUM WAVES: Timothy Closs waves.

82 CBM-64 MOVE SCREEN: Rae West does some screen shifting.

85 YOUR COMPUTER GRAND £2500 COMPETITION: First prize Apricot F-1E with colour monitor, second F1E with monochrome monitor, third — an F-1E.

88 ZX-81 PONGY: You are a penguin. Ice-blocks make you nervous. You have just typed in Miquel van Smoorenburg's program. Have an ice day.

92 TELSOFT: Your Computer software down the phone. This month: CBM-64 Deathtrap, Spectrum Backboogie and Spectrum To The Top and BBC Jump Jet Assault.

95 CBM-64 SPACE JUNK: You are a space junkie. You have been typing this code in for five months. Now the mission draws to a close. A nation mourns.

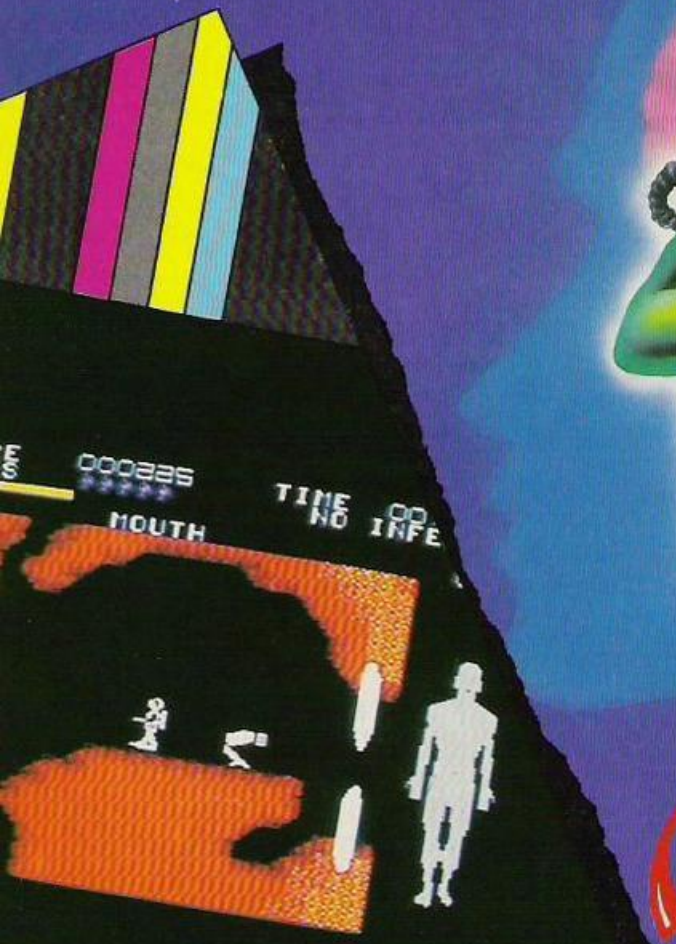
96 AMSTRAD BACKUP: K R Laslett's program for honest readers.

99 RESPONSE FRAME: Tim Hartnell answers readers questions.

101 SOFTWARE FILE: Ten pages of software for most micros.

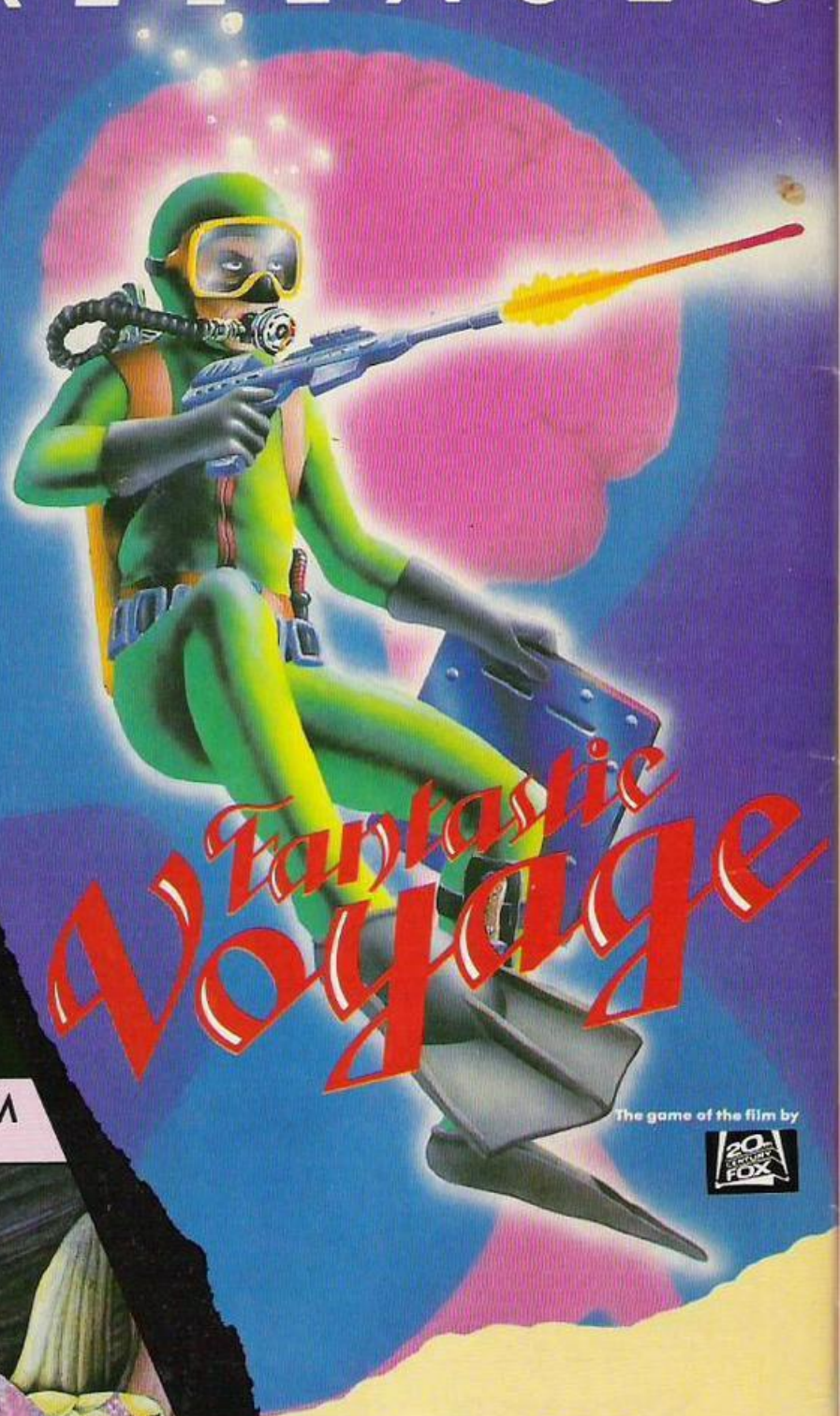
122 DATEBASE: Paul Bond rounds up forthcoming computer events.

NEW RELEASES



6.95 48K SPECTRUM

Mighty Magus



Fantastic Voyage

The game of the film by 20 Century Fox

QUICKSILVA

Argus Press Software Group

Quicksilva Mail Order,
P.O. Box 6, Wimborne,
Dorset BA21 7PY.
Telephone (0202) 891744.

Selected titles available at:
WHSMITH
Boots
WOOLWORTH
John Menzies
and leading multiple retailers and specialist computer stores.

SPECTRUM £6.95
COMMODORE £7.95
AMSTRAD £8.95

COMING SOON

Frank Bruno's BOXING

GAME FEATURES

- Eight fiery opponents, each with their own distinctive fighting style.
- Smooth-scrolling camera action, giving the best view of the fight at all times.
- Furious three minute rounds with 'knock-down' and 'knock out' features.
- Warm-Up and 'Autoplay' sequences.
- K.O. Meter, Best K.O. Time, Score and Bonus displayed on screen.
- Additional boxers to load from tape.
- Hall of fame.
- Endorsed by Heavyweight Champion – Frank Bruno.

SPECTRUM SCREEN SHOT

elite

Elite Systems Limited Anchor House Anchor Road Aldridge Walsall West Midlands Telephone (0922) 55852 Telex 335622 SPETEL G

spectrum

Sinclair Flat Screen T.V.

- Pin sharp picture gives a bright, clear image almost anywhere, anytime.
- Powered from long life lithium batteries or via optional mains adaptor
- Receives UHF broadcasts anywhere (except France and Communist Bloc)
- Complete with intergral fold-away aerial: personal earphone and smart soft carrying case and battery.

£99.95

Accessories:
Optional mains adaptor £7.95
Spare batteries, pack of 3 ..... £9.95

Only £8 monthly with Spectrum Chargecard*. APR 29.8% (variable).

New Products!

Enterprise Computer

- RAM 64K expandable to 3.9 megabytes
- ROM 48K including BASIC cartridge expandable up to 3.9 megabytes
- Very sophisticated operating system, providing a dynamic memory management technique around a Z80A processor running 4MHz
- Built in word processor
- Graphics resolution up to 672 x 512, colours up to 256 on screen
- Stereo sound from 4 voices over 8 octaves
- Fully structured ANSI standard BASIC
- Keyboard, 68 full travel keys, space bar and built in joystick
- 2 external joystick ports, 2 cassette interfaces
- Parallel printer port, RGB monitor output
- Full expansion possible via a 64-way interface
- RS423 serial interface and built-in network for up to 32 computers
- Cartridge ROM bay, to 64K

£179.95

Only £11 monthly with Spectrum Chargecard* APR 29.8% (variable).

Mitsui Quick Data Drive for MSX Computers	£139.95
Mitsui Quick Data Diskette	£3.99
Cumana Electron Interface	£149.95
Commodore Business Package	£549.95
Quendata DMP1100 Printer	£269.99
Juki 2200 Portable Typewriter/Daisywheel Printer	£343.83
Canon PW1080A Printer	£349.00
Elephant 5¼" Diskettes (IQ Box) from	£22.50
System 2000 Computer Desk and Monitor Bridge	£49.95

SAVE OVER £150

NEW!

Commodore 64 Business Package

- Commodore 64 Computer
- Commodore 1541 disc drive
- Commodore MSP 801 printer
- Plus "Future Finance" & "Easy File"

Spectrum Price **£549.95**

Only £23 with Spectrum Chargecard*. APR 29.8% (variable)

Spectrum Price **£308.50**

SAVE OVER **£50**

Regular price if brought separately £359.87

Only £13 monthly with Spectrum Chargecard* APR 29.8% (variable)

"Super Value"

MSX Package

- Goldstar MSX Computer
- Mitsui quick data drive
- Power supply for quick data drive
- Two discs for quick data drive

Super Computer Offers from Spectrum

£349.95

BBC Model B

with built in Speech Synthesiser worth £50

Only £15 monthly with Spectrum Chargecard*. APR 29.8% (variable).

£129.95

Sinclair Spectrum +

"Fantastic Value for Money"

- 48K RAM
- 8 colours
- 10 octave sound
- Professional keyboard

Only £8 monthly with Spectrum Chargecard*. APR 29.8% (variable).

Spectrum 48K

Plus FREE! Software 6 Pack

£89.95

Only £8 monthly with Spectrum Chargecard*. APR 29.8% (variable).

Atari 800XL Starter Pack

Includes:
- Atari 1010 data recorder
- Introduction to programming software
- Pole position game cassette
- Demonstration cassette

£129.99

Only £8 monthly with Spectrum Chargecard*. APR 29.8% (variable).

Not all stores carry every advertised item, please phone before making a journey · prices correct at time of going to press E&OE

spectrum CHARGE CARD

Up to £1000 Instant Credit

*There's up to £1,000 worth of Instant Credit available on a Spectrum Chargecard. See your local SPECTRUM dealer for written details (UK mainland only). Typical APR 29.8%.

Latest News

for up to date, information & offers from SPECTRUM - see PRESTEL page 600181 for details.

Super Value
Printers & Disc Drives
from Your Computer Specialist Nationwide

Brother EP-44 Printer/Typewriter

£249.95

'Transforming Office Machinery', runs Brother's slogan - with these super-compact battery powered type-writers it's easy to see why.

- Top quality thermal head
- 4K of text memorise (3 A4 pages)
- Centering if required
- 15-digit LCD display for pre print corrections
- Line-by-line edit facility

Only £11 monthly with Spectrum Chargecard*. APR 29.8% (variable)

£199.00

Commodore 1541 Disc Drive

- 5¼ inch disc
- Expansion bus for other peripherals
- Built in disc controller and operating system

Only £9 monthly with Spectrum Chargecard*. APR 29.8% (variable)

£199.95

Amstrad 3" Disc Drive

- 3 inch disc drive
- Single sided, double density
- CPM & Logo
- Built in power supply
- Complete with interface

Only £9 monthly with Spectrum Chargecard*. APR 29.8% (variable).

£199.95

Brother M1009 Printer

- 50 cps Bidirectional printing
- normal/enlarged/condensed/emphasized/Elite /superscript/subscript characters
- Centronics interface
- Optional RS232 Interface

Only £9 monthly with Spectrum Chargecard*. APR 29.8% (variable)

£149.95

Brother HR5 Printer with Commodore Cable

- Top quality Letter-quality daisywheel printing
- Between 13 and 18cps
- Bi-directional printing
- Tractor-fed paper or single sheets

Only £8 monthly with Spectrum Chargecard*. APR 29.8% (variable)

Cumana Disc Drives

NEW LOWER PRICES

NEW LOWER PRICES

CSX 100 40 Track 100K SS	£124.95
CSX 200S 40/80 Track 100K SS	£159.95
CSX 400S 40/80 Track 100K SS	£189.95
CS 200S 40/80 Track SS with PSU	£192.95
CS 200D 40 Track DS with PSU	£169.95
CD 200 40 Track Dual Drive with PSU	£294.95
CS 400S 80 Track DS with PSU	£219.95
CD 400D 80 Track DS Dual Drive with PSU	£325.95
CD 800S Dual 40/80 Track DS with PSU	£414.95
Cumana 351 SS 40 Track 3½" Drive	£159.95
Cumana 354 DS 80 Track 3½" Drive	£229.95

Juki 2200 Printer

NEW!

£343.85

Electronic daisywheel typewriter with RS-232C or Centronics Interface for computer printer

- 10 cps
- 10/12/15 cpi pitch
- 12 inch paper width/9 inch print width
- Normal/decimal tabs

Only £15 monthly with Spectrum Chargecard*. APR 29.8% (variable)

Opus Disc Drives

Opus 5401 100K SS 40 track	£149.95
Opus 5402 200K DS 40 track	£169.95
Opus 5802 400K DS 40/80 track	£199.95
Opus 5802D 2x400K DS 40/80 Track	£499.95

Entrepo Quick Data Drive

£79.95

- Quick operating system
- Extra blan microwafer and operating manual

Only £8 monthly with Spectrum Chargecard*. APR 29.8% (variable)

£269.99

NEW!

Quendata DMP 1100 Printer

- Bi-directional printing
- Normal/enlarged/condensed/Elite/characters
- Centronics interface
- Optional RS232 interface

Only £12 monthly with Spectrum Chargecard*. APR 29.8% (variable)

£399.00

Juki 6100 Daisy Wheel Printer

- 20cps (av. 18cps Shannon Text)
- 10/12/15 or Proportional character spacing
- Bidirectional friction-feed
- Tractor-feed or cut paper

Only £17 monthly with Spectrum Chargecard*. APR 29.8% (variable)

£139.95

'New Exclusive'

Mitsui Quick Data Drive for MSX

Also available

MSX Printer Lead	£19.95
MSX Monitor Lead	£3.95
MSX Quickshot I Joystick	£9.95

Only £8 monthly with Spectrum Chargecard*. APR 29.8% (variable)

Canon PW-1080A

NEW!

£349.00

Dot Matrix Printer

- 160 cps
- Bidirectional printing in text mode
- Normal/enlarged/condensed/ condensed/enlarged/Elite/ Elite enlarged/characters
- Centronics interface
- Optional RS232 interface

Only £17 monthly with Spectrum Chargecard*. APR 29.8% (variable)

Rotronics Wafer Drive

£129.95

- Versatile twin datadrive for the ZX Spectrum
- Twin 128K drives
- 16K, 64K or 128K Wafers

Only £8 monthly with Spectrum Chargecard*. APR 29.8% (variable)

Datafax Disc Interface

£79.95

Allows you to run 3-3½" or 5¼" disc drives with Spectrum or Spectrum Plus

Only £8 monthly with Spectrum Chargecard*. APR 29.8% (variable)

Spectrum Computer Centres have no connection whatsoever with the ZX Spectrum Computer manufactured by Sinclair Research Ltd.

Computer Dealers

or prospective dealers. If you would like to know more about becoming a SPECTRUM APPOINTED DEALER on an exclusive area basis, please write to Bob Cleaver, Spectrum Group PLC, Hunting Gate, Hitchin, Herts. SG4 0TJ. Tel: (0462) 37171

More from Spectrum...

spectrum

Super Value Monitors & T.V.'s from Spectrum

Fidelity Prism Monitor
for use with the Sinclair QL

£199.95

Only £9 monthly with Spectrum Chargecard* APR 29.8% (variable).

Fidelity CM14 Monitor

£199.95

Only £9 monthly with Spectrum Chargecard* APR 29.8% (variable).

Commodore 1702 Monitor

£230.00

- 14" colour, sound monitor
- PAL/RGB composite
- Tint and volume controls

Only £10 monthly with Spectrum Chargecard* APR 29.8% (variable).

Microvitech Cub
1451 Monitor for use with the QL

£275.00

Only £12 monthly with Spectrum Chargecard*. APR 29.8% (variable).

Microvitech Cub
452/1431 Monitor
Standard Resolution for BBC

£229.00

Only £10 monthly with Spectrum Chargecard*. APR 29.8% (variable).

AVT Monitors

£99.95

- Available in Green or Orange screen displays
- Glare or Non-Glare screens
- For office micros, or personal computers

Only £8 monthly with Spectrum Chargecard*. APR 29.8% (variable).

Tatung 14" Colour T.V.

£234.95

- TV/RGB switchable
- 8 channels
- 14" tube

Only £10 monthly with Spectrum Chargecard* APR 29.8% (variable).

Sanyo CRT36 Monitor

£146.05

Only £8 monthly with Spectrum Chargecard* APR 29.8% (variable).

Super Value Accessories

Super Value Package for Spectrum
Currah Microslot for ZX Spectrum
Currah Microspeech for ZX Spectrum

- DK Tronics single port joystick interface
- Quickshot II joystick

£41.75

SAVE OVER £5.00

Only £8 monthly with Spectrum Chargecard*. APR 29.8% (variable).

Regular Price if brought Separately £46.85

Joystick Converter for CBM C16 Plus Quickshot 2 Joystick

£12.95

Regular Price £15.70
SAVE £2.75

Only £8 monthly with Spectrum Chargecard*. APR 29.8% (variable).

DK Tronics Dual Port Interface for Oric Plus Interceptor Joystick

£18.95

Regular Price £21.95
SAVE £3.00

Only £8 monthly with Spectrum Chargecard*. APR 29.8% (variable).

'Unique to Spectrum Authorised Dealers'

DK Tronics Single Port Interface Plus Quickshot II Joystick
for the Spectrum

£17.95

Only £8 monthly with Spectrum Chargecard* APR 29.8% (variable).

Omega Data Recorder
with Azimuth Tape
Plus Gemini Carrying Case inc. 10 x C12 cassettes

£27.50

SAVE OVER £3.00

Only £8 monthly with Spectrum Chargecard*. APR 29.8% (variable).

Cheetah Infra Red Joystick
Plus Currah Microspeech For Commodore 64

£47.75

SAVE OVER £4.00

Only £8 monthly with Spectrum Chargecard*. APR 29.8% (variable).

System 2000 Desk

£49.95

- Movable bridge
- Shelf below work finish surface
- Attractive design with natural pine finish legs and support rails and magnolia surfaces

Only £8 monthly with Spectrum Chargecard* APR 29.8% (variable).

Not all stores carry every advertised item, please phone before making a journey - prices correct at time of going to press E&OE

spectrum CHARGE CARD

Up to £1000 Instant Credit

*There's up to £1,000 worth of Instant Credit available on a Spectrum Chargecard. See your local SPECTRUM dealer for written details (UK mainland only). Typical APR 29.8%.

Latest News

for up to date, information & offers from SPECTRUM - see PRESTEL page 600181 for details.

Your Computer Specialist Nationwide There's one near you!

AVON

BATH Software Plus, 12 York St Tel: (0225) 61676
WESTON-S-MARE K & K Computers, 32 Alfred St Tel: (0934)419324

BEDFORDSHIRE

BIGGLESWADE HCCS Ltd., 22 Market Sq., Tel: (0767) 318844
DUNSTABLE Dormans 7-11 Broad Walk Tel: (0582) 65515
LUTON Terry-More, 49 George St Tel: (0582) 23391/2

BERKSHIRE

BRACKNELL Computer Centre, 44 The Broadway, Tel: (0344) 427317
READING Reading Video Centre, 73 Whitley St. Tel: (0734) 751690
SLOUGH MU Games and Computers 245 High St. Tel: (0753) 21594
WINDSOR Gadgets 30 Peascod St., Tel: (07535) 67211

BUCKINGHAMSHIRE

CHESHAM Reed Photography & Computers, 113 High St. Tel: (0494) 783373

CAMBRIDGESHIRE

HUNTINGDON T.S.C. Electronics, 3 All Saints Passage, High St. Tel: (0480) 411579
PETERBOROUGH Logic Sales, 6 Midgate Tel: (0733) 49696

CHANNEL ISLANDS

GUERNSEY Gruts, 3-5 The Pollett, St Peter Port Tel: (0481) 24682
JERSEY Audio & Computer Centre, 7 Peter St, St Helier. Tel: (0534) 74000

CHESHIRE

ALTRINCHAM Mr Micro 28 High St. Tel: (061) 941 6213
CHESTER Computer Link, 21 St. Werburgh St. Tel: (0244) 316516
CREWE Microman Unit 2, 128 Nantwich Rd. Tel: (0270) 216014

CLEVELAND

MIDDLESBOROUGH McKenna & Brown, 206 Linthorpe Rd. Tel: (0642) 222368

CORNWALL

SALTASH C & J Videos, 85 St. Stevens Rd. Tel: 075 55 5585
ST AUSTELL A B & C Computers, Duchy House, 6 Lower Aylmer Sq. Tel: (0726) 67337

CUMBRIA

BARROW IN FURNESS Cumbria Audio Visual & Electrical (C.A.V.E.), 48 Cavendish Street Tel: (0229) 20109
PENRITH Penrith Communications, 14 Castlegate. Tel: (0768) 67146 Open Mon-Fri till 8pm
WHITEHAVEN P D Hendren 15 King St. Tel: (0946) 2063

DERBYSHIRE

ALFRETON Gordon Harwood 69-71 High St. Tel: (0773) 832078
HEANOR Logic Electrical Engineers, Godfrey St. Heanor Derby Tel: (0773) 76980

DEVON

BRIXHAM Discus Computers, Beach Approach, Tel: (08045) 55532
EXETER Seven Counties (Computers) Ltd., 7 Paris Street. Tel: (0392) 211211
EXMOUTH Open Channel, 30 The Strand. Tel: (0395) 264408
PLYMOUTH Syntax Ltd., 76 Cornwall St. Tel: (0752) 28705
TIVERTON Actron Micro Computers, 37 Bampton St. Tel: (0884) 252854

DORSET

DORCHESTER Seven Counties Cptrs. 20 High Street East Tel: (0305) 66022
POOLE Lansdowne Cptr Centre 14 Arndale Centre Tel: (0202) 670901

DURHAM

DARLINGTON McKenna & Brown, 102 Bondgate. Tel: (0325) 459744

ESSEX

BASILDON Godfrey's 28-32 East Walk, Tel. (0268) 289379
BASILDON Godfrey's Computer Centre, 5 Laindon Main Centre Laindon. Tel: (0268) 416747
CHELMSFORD Maxton Hayman Ltd., 5 Broomfield Rd. Tel: (0245) 354595
GRAYS H Reynolds. 79 Orsett Rd. Tel: (0375) 5948
SOUTHEND Computer Centre 332 London Rd. Tel: (0702) 337161

HAMPSHIRE

BASINGSTOKE Fisher's, 2-3 Market Place. Tel: (0256) 22079
PORTSMOUTH (Waterlooville) G B Microland, London Rd., (Opp. Co-op) Tel: (0705) 259911
SOUTHAMPTON L.T.C. Ltd., 112 East St., Tel: (0703) 33395B/24703

HEREFORD

HEREFORD Melgray Hi-Tech Ltd., 53/54 Commercial Str., Tel: (0432) 275737

HERTFORDSHIRE

POTTERS BAR The Computer Shop, 197 High St. Tel: (0707) 44417
STEVENAGE D J Computers, 11 Town Square. Tel: (0438) 65501
WATFORD SRS Microsystems Ltd., 94 The Parade, High St. Tel: (0923) 26602
WELWYN GARDEN CITY D J Computers, 40 Fretherne Rd., Tel (07073) 28435/28444

HUMBERSIDE

BEVERLEY Computing World, 10 Swaby's Yard Dyer Lane. Tel: (0482) 881831
GRIMSBY RC Johnson Ltd., 22 Friargate, Riverhead Centre. Tel: (0472) 42031
HULL The Computer Centre, 26 Anlaby Rd. Tel: (0482) 26297

ISLE OF MAN

DOUGLAS T H Colebourn Ltd., 57-61 Victoria St. Tel: (0624) 3482

ISLE OF WIGHT

COWES Beken & Son, 15 Bath Rd. Tel: (0983) 297181

KENT

BECKENHAM Supa Computers Ltd., 425 Croydon Rd., Tel: (01) 650 3569
BROADSTAIRS Video Vision 19/20 Willow Court, St. Peters Park Road Tel: (0843) 63284 (No Early Closing Day)
BROMLEY Computers Today 31 Market Square Tel: (01) 290 5652
CANTERBURY Canterbury Computer Centre, 56-57 Palace Street. Tel: (0227) 62101
DOVER Kent Photos & Computers, 4 King St. Tel: (0304) 202020
RAINHAM Microway Computers Ltd., 39 High St. Medway Towns., Kent Tel: (0634) 376702
SEVENOAKS Ernest Fielder Computers, Dorset Street, Tel: (0732) 456800
SITTINGBOURNE Computers Plus, 65 High St. Tel: (0795) 25677
TUNBRIDGE WELLS Modata Computers Ltd. 28-30 St Johns Rd. Tel: (0892) 41555

LANCASHIRE

PRESTON 4-Mat Computing Ltd., 67 Friargate Tel: (0772) 561952

LONDON

E6 Percivals, 85 High St. North, East Ham. Tel: (01) 472 8941
E17 Erol Computers Ltd., 125 High Street Walthamstow Tel: (01) 520 7763
EC2 Devron Computer Centre, 155 Moorgate Tel: (01) 638 3339/1830
N14 Logic Sales, 19 Broadway, The Bourne, Southgate. Tel: (01) 882 4942
N20 Castlehurst Ltd. 1291 High Rd. Tel: (01) 446 2280
NW11 Computers Inc., 86 Golders Green Rd. Tel: (01) 209 0401/0279
SE1 Vic Odden's 6 London Bridge Walk. Tel: (01) 403 1988
SE9 Square-Deal, 373-375 Footscray Rd., New Eltham. Tel: (01) 859 1516
SE15 Castlehurst Ltd., 152 Rye Lane, Peckham. Tel: (01) 639 2205
W1 Computers of Wigmore St., 104 Wigmore St. Tel: (01) 935 2452
W1 Micro-Foto,14-16 Quadrant Arcade, Regent Street Tel: (01) 437 5336/5471
W1 Sonic Foto & Micro Centre, 256 Tottenham Court Rd. Tel: (01) 580 5826
W1 Ramsons, 4 Edgeware Road, Tel: 01 724 2373

GREATER MANCHESTER

OLDHAM Home & Business Computers Ltd., 54 Yorkshire St. Tel: (061) 6331608
ROCHDALE Home & Business Computers, 75 Yorkshire Street. Tel: (0706) 344654
SWINTON Mr Micro Ltd., 69 Partington Lane. Tel: (061) 728 2282 Late Night Friday
WIGAN Wilding Ltd., 11 Mesnes St. Tel: (0942) 44382

MERSEYSIDE

LIVERPOOL Home & Business Cptrs 31 Bold St. Tel: (051) 708 0428
LIVERPOOL Beaver Radio, 20-22 Whitechapel. Tel: (051) 709 9898
LIVERPOOL (Aintree) Hargreaves, 31-37 Warbreck Moor. Tel: (051) 525 1782

MIDDLESEX

PINNER Spectrum 91 Field End Rd., Eastcote Tel: (01) 868 6830/6860
UXBRIDGE J K L Computers, 7 Windsor St. Tel: (0895) 51815

NORFOLK

KING'S LYNN Computer Plus, 40 Conduit St. Tel: (0553) 774550
NORWICH Norwich Camera Centre 20 White Lion Str. Tel: (0603) 612537
NORWICH Spectrum, 11A Castle Meadow Tel: (0603) 663796
THETFORD C B & Micros, 21 Guildhall Street. Tel: (0842) 61645

NORTHAMPTONSHIRE

NORTHAMPTON Dormans, 22 Princes Walk Grosvenor Centre. Tel: (0604) 37031

NOTTINGHAMSHIRE

NOTTINGHAM Jacobs Computers, 13 Middlegate Newark. Tel: (0636) 72594
WORKSOP Computagrafix, 132 Bridge St. Tel: (0909) 472248

NORTHERN IRELAND

NEWRY Newry Computer Centre. 34 Monaghan St. Tel: (0693) 66545

NORTHUMBERLAND

MORPETH Telerents 31 Newgate St. Tel: (0665) 513 537

OXFORDSHIRE

ABINGDON Ivor Fields Computers, 21 Stert St. Tel: (0235) 21207
BANBURY Computer Plus, 2 Church Lane. Tel: (0295) 55890
OXFORD Ivor Fields, 7 St Ebbes St. Tel: (0865) 247082

SCOTLAND

ABERDEEN Dee Micro 278 George Street Tel: (0224) 644350
AYR Vennals, 6A New Bridge St. Tel: (0292) 264124
DUNDEE Micromania 60 Gray St., Boughty Ferry Tel: (0382) 77130
HAMILTON Tom Dickson Computers, 8-12 Cadzow St. Tel: (0698) 283193

SHROPSHIRE

SHREWSBURY Computerama, 13 Castlegate. Tel: (0743) 60528
TELFORD Computer Village, 4 Hazeldine House Telford Town Centre. Tel: (0952) 506771

SOMERSET

TAUNTON Grays, 1 St James St. Tel: (0823) 72986

STAFFORDSHIRE

STAFFORD Coimputerama, 59 Forgate St. Tel: (0785) 41899
STOKE-ON-TRENT Computerama, 11 Mkt Square Arcade Hanley. (0782) 268620
HEDNESFORD Disco's Ltd., East Cannock Rd., Tel: (054) 382021

SUFFOLK

BURY ST EDMUNDS Guildhall Cptr Ctr, 11 Guildhall St. Tel: (0284) 705772
LOWESTOFT John Wells, 44 London Rd North Tel: (0502 3742

SURREY

CAMBERLEY Camera Arts (Micro Computer Division), 36 High St. Tel: (0276) 65848
CROYDON Vision Technology Ltd., 53/59 High Street Tel: (01) 681 3022
EPSOM The Micro Workshop, 12 Station Approach Tel: (03727) 21533
WALLINGTON Surrey Micro Systems Ltd., 53 Woodcote Rd. Tel: (01) 647 5636
WOKING Harpers, 71-73 Commercial Way. Tel: (04862) 25657

SUSSEX

BEXHILL-ON-SEA Computerware, 22 St Leonards Rd. Tel: (0424) 223340
BOGNOR REGIS Bits & Bytes High Str., Tel: (0243) 867143
BRIGHTON Gamer 71 East St. Tel: (0273) 728681
BURGESS HILL Weald Cptrs, 247-249 London Rd. Tel: (04446) 41381
LITTLEHAMPTON Alan Chase Ltd. 39 High St. Tel: (0903) 715674

WALES

ABERYSTWYTH AberData at Galloways, 23 Pier St. Tel: (0970) 615522
CARDIFF Randall Cox, 18-22 High St Arcade. Tel: (0222) 31960
NEWPORT (Gwent) Randall Cox, 118 Commercial St. Tel: (0633) 67378
PEMBROKE Randall Cox, 19 Main St. Tel: (064) 682876
WREXHAM Wrexham Computer Centre, 24 Abbot St., Clywd Tel: (0978) 358832

WARWICKSHIRE

NUNEATON Micro City 1A Queens Road Tel: (0203) 382049

WEST MIDLANDS

BIRMINGHAM Software World 12 Ethel Street Tel: (021) 643 7559
COVENTRY Greens, 22 Market Way Tel: (0203) 28342
DUDLEY Central Computers, 35 Church Hill Precinct. Tel: (0384) 238169
WALSALL New Horizon Computer Centres, 1 Goodall St. Tel: (0922) 24821
WEST BROMWICH Bell & Jones, 39 Queens Square. Tel: (021) 553 0820
WOLVERHAMPTON Wolverhampton Computer Centre, 17/19 Litchfield St. Tel: (0902) 29907

WORCESTER

KIDDERMINSTER Central Computers, 20-21 Blackwell Street, Tel: (0562) 746941
WORCESTER David Waring Ltd., 1 Marmion House High St. Tel: (0905) 27551

YORKSHIRE

BRADFORD Empire Electro Centres Ltd., Victoria Shopping Centre, 441 Thornton Rd. Tel: (0274) 492190
BRADFORD Erricks, Fotosonic House Rawson Square. Tel: (0274) 309266
DONCASTER The Soft Centre 8 Queensgate Waterdale Centre Tel: (0302) 20088
ROTHERHAM GT Leisureworld, Cascade Centre Tel: (0709) 67391
SHEFFIELD BSB Computers Ltd. 202 Whitham Rd, Broomhill Tel: (0742) 668251
SHEFFIELD HVL Computers 812 Ecclesall Rd., Tel: (0742) 661328
YORK York Computer Centre 7 Stonegate Arcade. Tel: (0904) 641862

Spectrum Computer Centres have no connection whatsoever with the ZX-Spectrum Computer manufactured by Sinclair Research Ltd.

spectrum

See your local Spectrum Computer Specialist today!

THOUGHTS & CROSSES

37 MARKET STREET, HECKMONDWIKE, WEST YORKS.

Telephone 0924-402337 Access Visa order 0924-409753

SHOP OPEN 9AM TO 5PM MONDAY TO SATURDAY MAIL ORDER OPEN 9AM TO 8PM MONDAY TO SATURDAY

ALL PRICES INCLUDE VAT AND DELIVERY

COMPUTERS

Apricot F1E 128K +315K disk drive.....£ P.O.A.
Apricot F1 256K +720K disk drive (with free software incl. Superwriter, Supercalc, Superplanner).....£ P.O.A.
Acorn Plus Microcomputer includes DFS.....£499.00
BBC Microcomputer Model B.....£349.00
BBC Model B with DFS.....£399.00
Acorn Electron.....£129.00
ZX Spectrum 48K.....£99.00
ZX Spectrum plus 48K (+ £50 free software.....£129.00
Memotech S12.....£255.00
Commodore 64 (+ £40 free software.....£199.00
Apple IIe with 2 disk drives and controller.....£995.00
Amstrad CPC464 (green) + £100 free software.....£239.00
Amstrad CPC464 (colour monitor) + £100 free software.....£349.00
Amstrad CPC664 (Col. with disk drive).....£429
Amstrad CPC664 (Green with disk drive).....£339
Sinclair QL.....£259.00

PRINTERS

Canon PW1080A with NLQ (+ free printer lead).....£315.00
Canon PW1080A (+ free QL interface).....£315.00
Canon PW1156A with NLQ.....£395.00
Epson P40.....£95.00
Epson RX80.....£259.00
Epson RX80 F/T.....£289.00
Epson FX80.....£375.00
Epson FX100.....£520.00
Brother HR5 (Centronics or RS232).....£155.00
Brother A.C. Adaptor.....£17.00
Brother HR15 (Centronics or RS232).....£375.00
Brother Cut-Sheet Feeder.....£220.00
Brother Keyboard.....£150.00
Brother EP44.....£235.00
Brother 1009 (Centronics).....£149.00
Juki 6100 (Centronics Daisy wheel).....£350.00
Juki 2200 typewriter Daisy wheel printer centronics.....£275.00
Juki Tractor Feeder.....£129.00
Juki Sheet Feeder.....£220.00
Daisy Step 2000 (Centronics Daisy wheel).....£750.00
Shinwa CPA80 (Centronics).....£215.00
Shinwa CPA80 (RS232).....£236.00
Mannesmann Tally MT80 plus (Centronics).....£199.00
Shinwa CP80 (Centronics).....£189
Commodore MPS 801.....£210.00
Alphacom 32 (Spectrum/ZX81 model).....£69.00
CCP 40 (4 colour printer plotter).....£105.00

PRINTER INTERFACES

Epson RS232 Interface.....£29.00
Epson RS232 Interface with 2K buffer.....£65.00
Canon RS232 Interface.....£80.00
Shiwa RS232 Interface with 2K buffer.....£60.00
Mannesman MT80 RS232 Interface.....£25.00
Mannesman MT80 2K buffer.....£16.00
Juki RS232 Interface.....£60.00
Kempston Interface-E (non) centronics interface for Spectrum.....£39.95
Kempston Interface-S (cass) centronics interface for Spectrum.....£29.95
Tasman Interface (cass) centronics interface for Spectrum.....£35.00
QL Centronics Interface.....£30.00
Atari Centronics Interface.....£30.00
Dwarowsoft Centronics Interface.....£30.00
Turbo Print GT Centronics Interface for Commodore 64/128.....£70.00
Stack Comm Cable Interface for Commodore Vic20/64.....£20.00
IEEE to Centronics Interface for Commodore 4032/8096.....£70.00
IBIX CBM64 to Parallel Interface.....£60.00
Tripler Centronics Interface for Commodore Vic20/64.....£50.00
Apple IIE Centronics Interface (Aristocard).....£69.00
Apple IIE Serial Interface Card.....£69.00
Electron Plus 1.....£58.00

PRINTER RIBBONS

Epson MX/FX/RX 80.....£4.00
Epson MX/FX 100.....£8.00
Seikosha GP100.....£4.50
Seikosha GP80.....£4.50
Microline (group 66).....£2.30
Aradnis.....£12.50
MPS 801.....£6.50
NLC 8023.....£7.00
Canon PW1080A.....£8.00
Canon PW1156A.....£8.00
Epson 100 refill.....£3.30
Shiwa CP80/CPA80.....£6.50
Mannesman Tally MT80.....£6.50
Riteman A1.....£7.00
Panasonic KX-P1110 (MTX).....£8.00
QUME MS.....£4.30
QUME nylon.....£6.50
Diablo MS.....£5.00
Diablo nylon.....£4.00
Diablo S/S.....£2.00
Juki 6100 SS.....£2.00
Juki 6100 MS.....£5.00
Brother EP44.....£2.30
Brother HR5.....£2.30
Brother M1009.....£3.80
Brother singlestrike HR15/25.....£5.00
Brother doublestrike HR15/25.....£6.00
Brother multistrike HR15/25.....£6.00
Others available, please ask.
Print wheels also available, please ask.

PRINTER LEADS

BBC Centronics Printer Leads.....£10.00
BBC Serial Printer Lead.....£10.00
Memotech Centronics Printer Lead.....£10.00
Dragon Centronics Printer Lead.....£10.00
Disc Commander Printer Lead.....£10.00
Amstrad Centronics Printer Lead.....£10.00
Sinclair Centronics Printer Lead.....£10.00
Spectrum Serial Printer Lead.....£10.00
ZX interface 1 to RS232 'D'.....£14.95
ZX Microdrive Lead.....£14.95
Centronics to 25 way 'D' lead.....£15.00
Centronics to Centronics lead.....£15.00
RS232 'D' to RS232 'D'.....£13.50

PRINTER PAPER

1000 sheets of continuous tractor feed paper.....£9.00
1000 singlefoldable tractor feed labels.....£6.50
Alphacom roll (black).....£1.40

MONITORS

Microvitec 1431 MS.....£199.00
Microvitec 1451 MS.....£290.00
Microvitec 1451 MZ.....£245.00
Microvitec 1451 MO.....£250.00
Microvitec 1451 AP MS4.....£345.00
Philips 7502 anti-glare green screen monitor (20MHz).....£78.00
Commodore 1702.....£210.00
Fidelity TVJmonitor.....£210.00
Fidelity EM14.....£178.00
Fidelity QL monitor (std res).....£199.00
Amstrad Modulator.....£35.00

DISK DRIVES

Commodore 1541 + Easy-script + 6 programs.....£210.00
Torch Disk Pack, Torch.....£800.00
Memotech, Memotech.....£410.00
Memotech (dual), Memotech.....£800.00
Amstrad 3" drive, Amstrad.....£160.00
Electron plus 3, Acorn.....£210.00

CUMANA

Single without PSU

CSX100 100K 40T.....£118.00
CSX200 200K 80T.....£155.00
CSX2000 200K 40T DS.....£163.00
CSX4000 400K 40/80T DS.....£181.00

Single with PSU

CS100 100K 40T.....£149.00
CS200 200K 80T.....£181.00
CS2000 200 40T DS.....£190.00
CS400 400K 40/80T DS.....£206.00

Twin drives with PSU

CD200 2x100K 40T.....£268.00
CD400D 2x200K 40T DS.....£361.00
CD400S 2x200K 40/80T.....£338.00
CD800S 2x400K 40/80T DS.....£402.00

OPUS

Single without PSU

5401 100K 40T.....£118.00
5402 200K 40T DS.....£155.00
5802 400K 40/80T.....£180.00

Single with PSU

5401P 100K 40T.....£145.00
5402P 200K 40T DS.....£183.00
5802P 400K 40/80T DS.....£208.00

Twin drives with PSU

5401D 2x100K 40T.....£265.00
5402D 2x200K 40T DS.....£349.00
5802D 2x400K 40/80T DS.....£399.00
3" 100K 40T.....£95.00

DISKETTES

Parrot, Wabash, 3M Scotch

S/S S/D 40T 10 for.....£15.00
S/S D/D 40T 10 for.....£16.00
D/S D/D 40T 10 for.....£20.00
D/S D/D 80T 10 for.....£26.00

Parrot diskettes include Free library case

Dysan Diskettes

104/10 S/S D/D 40T 10 for.....£20.00
104/2D D/S D/D 40T 10 for.....£29.00
204/2D D/S D/D 80T 10 for.....£35.00
3" Maxell Diskettes single.....£4.50
3.5" Hewlett Packard single.....£4.50
3.5" Hewlett Packard double.....£5.50

PVC COVERS

Apricot F1.....£6.50
BBC.....£2.90
Acorn Electron.....£2.90
BBC Cassette Recorder.....£2.90
ZX Spectrum.....£2.90
ZX Spectrum Plus.....£2.99
Saga Keyboard.....£3.99
Sinclair QL.....£3.99
Vic 20/64.....£3.99
Dragon 32/64.....£3.99
Memotech S12.....£3.99
Amstrad CPC464.....£3.99
Amstrad Monitor (green).....£2.90
Amstrad Monitor (colour).....£4.20
Philips Monitor.....£4.80
Microvitec 14".....£4.80
Tect Match.....£5.95
Mini Office.....£5.95
Dark Star.....£7.95
Tank Busters.....£7.95
Fighter Pilot.....£8.95
Combat Lynx.....£8.95
Death Pit.....£6.95
Warrior Attack.....£8.95
Roland Goes Square Bashing.....£8.95
Jet Boot Jack.....£8.95
Bridge-It.....£8.95
Centre Court.....£8.95
Roland on the Run.....£8.95
Mr Freeze.....£2.50
Wild Bunch.....£2.50
Oh Mummy.....£8.95
Roland Goes Digging.....£8.95
Roland In Time.....£8.95
Spannerman.....£8.95
Sultana Maze.....£8.95
The Quill.....£14.95
Technician Ted.....£8.95
Devpac.....£24.95
Fort 464.....£24.95
Pascal.....£24.95
Classic Racing.....£6.95
Millionaire.....£6.95
Galaxi.....£6.95
Arnold Goes Somewhere Else.....£6.50
Wise & Foot Arnold.....£6.95
Roland in the Caves.....£8.95
Roland on the Ropes.....£8.95
The Galactic Plague.....£8.95
Andromeda.....£8.95
Chopper Squad.....£6.95
Jewels of Babylon.....£6.95
Essi Amsoord.....£8.95
Story Of Ten.....£8.95
Games of Strabus.....£8.95
Home Budget.....£17.95
Logic.....£9.95
Adventure Quest.....£9.90
Mental Adventure.....£9.90
Dungeon Adventure.....£9.90
Emerald Isle.....£9.95
Lords of Time.....£9.90
Return to Eden.....£9.90
Snowball.....£9.90
Johnny Reb.....£6.95
Redoubt.....£6.95
Rescue Operations.....£6.95
Sir Lancelot.....£6.95
The Hobbit.....£14.95
Er*Bert.....£8.95
Laser Warp.....£8.95
Master Chess.....£8.95
Pyramania.....£8.95
Codename Mat.....£8.95
Mutant Hedgehog.....£8.95
Ghouls.....£8.95
Ghosts Goblins & Gauntlet.....£9.95
American Football.....£9.99
Crazy Golf.....£8.95
Cubit.....M£8.95
Mr£8.95
Erik The Viking.....£9.95
Lift Simulation.....£11.95
Machine Code Tutor.....£14.95
Daley Thompson's Decathlon.....£6.95
Gilligans Gold.....£6.50
Hunchback.....£7.90
Hunchback II.....£8.90
Kong Strikes Back.....£8.95
Xenolograms.....£8.95
Space Killer.....£9.95
Bite Bite.....£9.95
3D Starstrike.....£6.95
Alien Break-in.....£8.95
Amsoft JV2 Attempt.....£8.95
Dragons Gold.....£8.95
3D Monster Chase.....£8.95
Essi-Amsoft.....£10.95
Electro Freddy.....£8.95
Jet Set Willy.....£8.95
Manic Miner.....£8.95
Jetsword.....£9.90
Tasgoy 464.....£9.90
Tasprint 464.....£19.95
Tasword 464.....£8.95
Admiral Graf Spee.....£9.95
Knight Lore.....£9.95
Sorcery.....£8.95

COMMODORE 64

Pathfinder/Sales Ledger.....£29.95
South Central.....£17.95
Rloc 64.....£7.50
Beamrider.....£9.95
DecatHon.....£9.95
Designers Pencil.....£14.95
Ghostbusters.....£10.99
H.E.R.O.....£9.95
Pastfinder.....£9.95
Pitfall II.....£9.95
River Raid.....£9.95

COMPUTER SOFTWARE

AMSTRAD Title	RRP	Our Price
Ghostbusters	£10.99	£9.99
Classic Adventure	£8.05	£8.05
Football Manager	£8.95	£8.05
Blagger	£7.95	£7.15
Defend or Die	£7.95	£7.15
Basic Tutorial 1	£19.95	£17.95
Complete Fortrawe	£24.95	£22.50
Complete D.S.	£24.95	£22.50
Decision Maker	£24.95	£22.50
Essi-Amsoctle	£19.95	£17.95
Guide to Basic 1	£19.95	£17.95
Guide to Basic 2	£19.95	£17.95
Microgen (disk)	£49.95	£44.95
Microscript (disk)	£49.95	£44.95
Microspread (disk)	£24.95	£22.50
Project Planner	£14.95	£13.50
Screen Designer	£19.95	£17.95
Star Watcher	£8.95	£8.05
Snooker	£9.95	£8.95
Eight Path 737	£6.95	£6.25
House of Usher	£7.95	£7.15
Moon Buggy	£6.95	£6.25
Survivor	£8.95	£8.05
World Cup	£8.95	£8.05
Animal Vegetable + Mineral	£8.95	£8.05
Happy Letters	£8.95	£8.05
Happy Numbers	£8.95	£8.05
Happy Writing	£8.95	£8.05
Map Rally	£8.95	£8.05
Timemaze One	£6.95	£6.25
Timemaze Two	£8.95	£8.05
Wizard Wang	£8.95	£8.05
Wizard Willy	£8.95	£8.05
Astro Attack	£7.95	£7.15
Time Bomb	£8.95	£8.05
Grand Prix Driver	£8.95	£8.05
Home Runner	£8.95	£8.05
Mastercalc CPC464	£24.95	£22.50
Masterfile CPC464	£24.95	£22.50
Steve Davis Snooker	£7.95	£7.15
Amsoft	£9.95	£8.95
Bridge Player 2	£9.95	£8.95
Football Wizard	£6.95	£6.25
Superchess	£9.95	£8.95
AMAN	£6.95	£6.25
Test Match	£8.95	£8.05
Mini Office	£5.95	£5.35
Dark Star	£7.95	£7.15
Tank Busters	£7.95	£7.15
Fighter Pilot	£8.95	£8.05
Combat Lynx	£8.95	£8.05
Death Pit	£6.95	£6.25
Warrior Attack	£8.95	£8.05
Roland Goes Square Bashing	£8.95	£8.05
Jet Boot Jack	£8.95	£8.05
Bridge-It	£8.95	£8.05
Centre Court	£8.95	£8.05
Roland on the Run	£8.95	£8.05
Mr Freeze	£2.50	£2.50
Wild Bunch	£2.50	£2.50
Oh Mummy	£8.95	£8.05
Roland Goes Digging	£8.95	£8.05
Roland In Time	£8.95	£8.05
Spannerman	£8.95	£8.05
Sultana Maze	£8.95	£8.05
The Quill	£14.95	£13.50
Technician Ted	£8.95	£8.05
Devpac	£24.95	£22.50
Fort 464	£24.95	£22.50
Pascal	£24.95	£22.50
Classic Racing	£6.95	£6.25
Millionaire	£6.95	£6.25
Galaxi	£6.95	£6.25
Arnold Goes Somewhere Else	£6.50	£5.85
Wise & Foot Arnold	£6.95	£6.25
Roland in the Caves	£8.95	£8.05
Roland on the Ropes	£8.95	£8.05
The Galactic Plague	£8.95	£8.05
Andromeda	£8.95	£8.05
Chopper Squad	£6.95	£6.25
Jewels of Babylon	£6.95	£6.25
Essi Amsoord	£8.95	£8.05
Story Of Ten	£8.95	£8.05
Games of Strabus	£8.95	£8.05
Home Budget	£17.95	£17.95
Logic	£9.95	£8.95
Adventure Quest	£9.90	£9.90
Mental Adventure	£9.90	£9.90
Dungeon Adventure	£9.90	£9.90
Emerald Isle	£9.95	£8.25
Lords of Time	£9.90	£9.90
Return to Eden	£9.90	£9.90
Snowball	£9.90	£9.90
Johnny Reb	£6.95	£6.25
Redoubt	£6.95	£6.25
Rescue Operations	£6.95	£6.25
Sir Lancelot	£6.95	£6.25
The Hobbit	£14.95	£13.50
Er*Bert	£8.95	£8.05
Laser Warp	£8.95	£8.05
Master Chess	£8.95	£8.05
Pyramania	£8.95	£8.05
Codename Mat	£8.95	£8.05
Mutant Hedgehog	£8.95	£8.05
Ghouls	£8.95	£8.05
Ghosts Goblins & Gauntlet	£9.95	£8.95
American Football	£9.99	£8.99
Crazy Golf	£8.95	£8.05
Cubit	M£8.95	£8.05
Mr£8.95	£8.05	
Erik The Viking	£9.95	£8.95
Lift Simulation	£11.95	£10.75
Machine Code Tutor	£14.95	£13.50
Daley Thompson's Decathlon	£6.95	£6.25
Gilligans Gold	£6.50	£6.20
Hunchback	£7.90	£7.10
Hunchback II	£8.90	£8.00
Kong Strikes Back	£8.95	£8.05
Xenolograms	£8.95	£8.05
Space Killer	£9.95	£8.95
Bite Bite	£9.95	£8.95
3D Starstrike	£6.95	£6.25
Alien Break-in	£8.95	£8.05
Amsoft JV2 Attempt	£8.95	£8.05
Dragons Gold	£8.95	£8.05
3D Monster Chase	£8.95	£8.05
Essi-Amsoctle	£19.95	£17.95
Electro Freddy	£8.95	£8.05
Jet Set Willy	£8.95	£8.05
Manic Miner	£8.95	£8.05
Jetsword	£9.90	£9.90
Tasgoy 464	£9.90	£9.90
Tasprint 464	£19.95	£17.95
Tasword 464	£8.95	£8.05
Admiral Graf Spee	£9.95	£8.95
Knight Lore	£9.95	£8.95
Sorcery	£8.95	£8.05
Space Shuttle	£14.95	£13.50
Toy Bizarre	£9.95	£8.95
Zeno	£9.95	£8.95
Football Manager	£7.95	£7.15
Questprobe (The Hulk)	£9.95	£8.95
Sorcerer of Claimorgue Castle	£9.95	£8.95
Voodoo Castle	£9.95	£8.95
Bat Attack	£7.95	£7.15
Blagger	£7.95	£7.15
Blagger Goes To Hollywood	£9.95	£8.95
Charlbuster	£9.95	£8.95
Contact Bridge	£12.95	£11.95
Damsel in Distress	£7.95	£7.15
Killer Weir	£7.95	Half Price
Son of Blagger	£7.95	£7.15
Battle Through Time	£7.95	£7.15
Catacombs	£9.95	£8.95
Cosmic Command	£9.95	£8.95
Flight Path 737	£7.95	£7.15
Galaxy	£7.95	£7.15
House of Usher	£7.95	Half Price
Moon	£6.95	£6.25
Moonbase	£7.95	£7.15
Pi Eyed	£7.95	£7.15
Stop Thief	£6.95	£6.25
Space Pilot	£7.95	£7.15
Tau Ceti	£7.95	£7.15
Zodiac	£7.95	£7.15
Aztechn	£11.95	£10.75
Operation Whirlwind	£11.95	£10.75
Raid on Bunny Bay	£6.95	£6.25
World Cup	£6.95	£6.25
The Fall of Rome	£6.95	£6.20
Alice in Video Land	£8.95	£8.05
Grand Master	£17.95	Half Price
Magic Spone	£9.95	£8.95
Magian Sorbtrawe	£39.95	£36.95
Swift Spreadsheet	£19.95	£17.95
Swift Trivia	£6.95	£6.35
Wordcraft		£85.00
Tasten 1500B	£9.95	£8.95
Chuckie Egg	£7.95	£7.15
Lava	£6.95	£6.25
Lords of Midnight	£9.95	£8.95
Mr Robot	£6.95	£6.25
PSI Warrior	£8.95	£8.05
Pyracon	£8.95	£8.05
Shadow Fire	£9.95	£8.95
Spy vs Spy	£9.95	£8.95
Bumping Buggies	£6.99	£6.30
Spannerman	£5.99	£5.39
Hustler	£6.99	Half Price
Kick Off	£6.99	£6.30
Poster Printer	£6.99	Half Price
Blitzer	£6.99	£6.30
Widow's Revenge	£5.99	£5.35
Wold Wizard	£6.99	Half Price
Twin Kingdom Valley	£9.50	£8.50
Impossible Mission	£8.95	£8.05
Potsnop II	£10.95	£9.90
Common Chess	£9.95	Half Price
Paddington's Disappearing Inh	£7.95	Half Price
Paddington's Early Visit	£7.95	Half Price
Paddington's Problem	£7.95	Half Price
Bishop	£9.99	Half Price
Chemistry	£9.99	Half Price
Easy Calc	£70.00	£67.50
Easy File	£50.00	£45.00
English Language	£9.99	Half Price
Geography	£9.99	Half Price
Go Racing with Peter O'Sullevan	£9.95	£8.95
History C 20	£12.95	Half Price
International Soccer	£7.95	£7.15
Le Mans	£9.99	Half Price
Maths 1	£34.99	£31.50
Maths 2	£34.99	Half Price
Maths 3	£9.99	Half Price
Precision Superbase	£99.95	£90.00
Programmer's Utils.	£14.99	£13.50
Railboss	£11.95	£10.75
Sorcerer's Basic	£50.00	£45.00
Bridge Player 2	£9.95	£8.95
Invasion	£7.95	£7.15
Chess Jim	£7.95	£7.15
Wing Commander	£7.95	£7.15
Derby Day	£7.95	£7.15
Practicalc	£39.95	£32.00
Quickal	£39.95	£32.00
747	£9.95	£8.95
Micro Olympics	£5.95	£5.35
DFM Database	£24.95	£22.00
Invoicer	£30.00	£27.00
Transact	£30.00	£27.00
Maxaco	£6.95	£6.25
Speed Dual 3D	£6.95	Half Price
Quickal	£14.95	£13.50
Oracle's Cave	£7.95	£7.15
Combat Lynx	£8.95	£8.05
Harrier Attack	£6.95	£6.25
Scuba Dive	£6.95	£6.25
HAvoc	£9.95	£8.95
Andromeda Conquest	£7.95	£7.15
Legionnaire	£7.95	£7.15
Lundon Blitz	£7.95	£7.15
Telengard	£7.95	£7.15
Airwolf	£6.95	£6.25
Kokotoni Wilf	£6.95	£6.25
The Pyramid	£9.95	£8.95
Booty	£2.50	£2.50
Gogo The Ghost	£2.50	£2.50
Headache	£2.50	£2.50
Mr Freeze	£2.50	£2.50
Egbert	£7.95	£7.15
The Fabulous Wanda	£7.95	£7.15
Tir Na Ning	£9.95	£8.95
Cuthbert 3	£9.95	£8.95
The Quill	£14.95	£13.50
Percy The Potty Pigeon	£7.95	£7.15
Suicide Express	£7.95	£7.15
Wizards Revenge	£7.95	£7.15
Gilbert's Day Out	£7.95	£7.15
Heathrow	£6.95	£6.25
Arcadia	£5.50	£4.95
Cosmic Cruiser	£5.50	£4.95
Pedro	£6.50	£5.85
Splat!	£6.95	£6.25
Moon Cresta	£8.95	£8.05
Asteroids	£6.95	£6.25
Aquanaut	£7.00	£6.30
Arabian Nights	£7.00	£6.30
China Miner	£7.00	£6.30
Dragon's Lair	£7.00	Half Price
Hovver Bovver	£7.00	Half Price
Scramble	£7.00	£6.30
Scion City	£7.00	£6.30
Spider & Fly	£7.00	£6.30
Wilmer's My Bones	£7.00	£6.30
Scope 64	£17.95	Half Price
BMX Stunts	£7.90	£7.10
Cavelon II	£7.90	£7.10
Quan	£7.90	£7.10
Sports & Character Editor	£7.90	£7.10
Valhalla	£14.95	£13.50
Monopoly	£12.95	£11.65
Scrabble	£12.95	£11.65
Adventure Quest	£9.90	£8.90
Adventure Quest (Disk)	£11.95	£10.75
Colossal Adventure	£9.90	£8.90
Colossal Adventure (Disk)	£11.95	£10.75
Dungeon Adventure	£9.90	£8.90
Dungeon Adventure (Disk)	£11.95	£10.75
Emerald Isle	£6.95	£6.25
Lords of Time	£9.90	£8.90
Lords of Time (Disk)	£11.95	£10.75
Return to Eden	£9.90	£8.90
Return to Eden (Disk)	£11.95	£10.75

Range of programs available for **MTX, BBC, and educational for all machines**

Please order stating (1) Programs required; (2) Computer; (3) Amount enclosed; (4) Name & Address

All prices include, packing & VAT. Overseas orders welcome.

THOUGHTS & CROSSES

37 MARKET STREET, HECKMONDWIKE, WEST YORKS.

COMMODORE 64

Title	RRP	Our
Snowball	£9.99	£8.95
Snowball (Disk)	£11.99	£10.75
Erik the Viking	£9.95	£8.95
Turbo 64	£7.99	£7.15
Arcopod	£7.50	£6.75
Attack of the Mutant Camels	£7.50	£6.75
Hover Bovver	£7.50	Half Price
Laser Zone	£7.50	£6.75
Matrix	£7.50	£6.75
Revenge of the Mutant Camels	£7.50	£6.75
Sheep in Space	£7.50	£6.75
Agent USA	£14.95	£13.50
Johnny Reb	£6.95	£6.25
Blockbusters	£7.95	£7.15
Brian Jacks Superstars	£7.95	£7.15
Quest for Merravid	£7.95	£7.15
Acos +	£8.99	£8.05
Castle of Terror	£9.95	£8.95
Shelock	£14.95	£13.50
Star Trooper	£7.95	£7.15
The Hobbit	£14.95	£13.50
Zim Zala Bim	£9.95	£8.95
Fassem	£6.95	£6.25
Jinn Genie	£6.95	£6.25
Felix in The Factory	£6.95	£6.25
Pyjamarama	£7.95	£7.15
American Football	£9.99	£8.99
Broad Street	£7.99	£7.20
Indiana Jones	£9.99	£8.99
Caesar The Cat	£8.95	Half Price
First Steps with The Mr Men	£8.95	£8.05
Games Creator	£12.95	£11.65
Go Sprite	£9.95	£8.95
Spitfire 40	9.95	£8.95
Fire Ant	£7.95	£7.15
Cybermen	£6.95	£6.25
Erik the Viking	£9.99	£8.95
Machine Code Tutor	£14.95	£13.50
Cliff Hanger	£7.95	£7.15
Basic Lightning	£19.95	£17.95
Basic Lightning (Disk)	£29.95	£26.95
Machine Lightning	£29.95	£26.95
Machine Lightning (Disk)	£39.95	£35.95
Whole Lightning	£19.95	£17.95
Whole Lightning (Disk)	£29.95	£26.95
Chinese Juggler	£6.90	£6.20
Dalley Thompson's Decathlon	£7.90	£7.10
Gilligan's Gold	£7.90	£6.20
High Noon	£7.90	£7.10
Hunchback	£6.90	Half Price
Hunchback II	£7.90	£7.10
Jonny & The Jempys	£6.90	£6.20
Kong Strikes Back	£7.90	£7.10
Mr Wimpy	£6.90	Half Price
Roland's Rat Race	£7.90	£7.10
Rollerball	£6.90	£6.20
Stunt Bike	£6.90	£6.20
TLL	£7.90	£7.10
Evil Dead	£6.90	£6.20
The Boss	8.95	£8.05
Romeo & Juliet	£6.95	£5.35
Superbase Starter	£39.95	£36.95
Mission 1	£7.95	£7.15
Bethlime	£7.95	£7.15
Ghost Town	£7.95	£7.15
Crystals of Zong	£7.95	£7.15
Mystery	£7.95	£7.15
Necropolis	£7.95	Half Price
Theatre Europe	£9.95	£8.95
Ant Attack	£7.95	£7.15
Aquaplane	£7.95	£7.15
Black Thunder	£6.95	£6.25
Boogie Boo	£7.95	£7.15
Fred	£7.95	£7.15
Gryphon	£7.95	£7.15
Magic Micro Mission	£7.95	£7.15
Purple Turtles	£7.95	£7.15
Quintic Warrior	£7.95	£7.15
See-Saw	£7.95	£7.15
Sting	£7.95	£7.15
Stronium Dog	£7.95	£7.15
Summer Games	£14.95	£13.50
Traffic	£7.95	£7.15
Trashman	£7.95	£7.15
Ultisynth	£14.95	Half Price
Everest Ascent	£6.50	£5.85
Transylvanian Tower	£6.50	£5.85
Urban Upstart	£6.50	£5.85
Pettit	£6.95	£6.25
BBC Emulator	£14.95	£13.50
S Steel Rat Saves The World	£9.95	£8.95
The Nomads of Time	£9.95	£8.95
Quick Disk	£14.95	£13.50
Jeepers Creepers	£5.99	5.35
Revelation	£5.95	£5.35
Ugh!	£7.95	£7.15
BC's Quest for Tires	£9.95	8.95
Dinky Doo	£7.95	£7.15
Jet Set Willy	£7.95	£7.15
Manic Miner	£7.95	£7.15
California Gold Rush	£9.99	£2.99
Faces of Maarne	£9.99	£2.99
Monkey Magic	£6.95	£6.25
Crisis Countdown	£7.95	£7.15
Astro Chase	£8.95	£8.05
Boulder Dash	£8.95	£8.05
Flip & Flop	£8.95	£8.05
Flight Simulation II	£9.95	£36.95
Flight Simulation II	£45.30	
Wordpower	£9.95	£8.95
Quest for Quintanaroo	£8.95	£8.05
Rollaverture	£8.95	£8.05
Kelah	£7.95	£7.15
West	£7.95	£8.95
Panorama H	£17.95	£16.25
Gyroscope	£6.90	£6.20
Poster Paster	£6.90	£6.20
Super Pipeline	£6.90	£6.20
Lazy Jones	£7.95	£7.15
Quo Vadis	£8.95	£8.95
Jack and the Beanstalk	£9.95	£5.35
Ghostbusters	£9.95	£8.95
The Staff of Kernath	£7.95	£7.15
Aztec Challenge	£8.95	Half Price
Battle for Normandy	£14.95	£13.50
Beach Head	£9.95	£8.95
Blue Max	£9.95	£8.95
Bounty Bob Strikes Back	8.95	£8.95
Bruce Lee	£9.95	£8.95
Buck Rogers	£9.95	£8.95
Combat Leader	£14.95	£13.50
Conan (disk)	£14.95	£13.50
Congo Bongo	£9.95	£8.95
Dombusters	£9.95	£8.95
Fak	£9.95	£8.95
Forbidden Forest	£8.95	£8.05
Fort Apocalypse	£8.95	£8.05
Frak 64	£9.95	£8.95
F-15 Strike Eagle	£14.95	£13.50
Grogs Revenge	£9.95	£8.95
Mystic Mansion	£8.95	£8.05
NATO Commander	£9.95	£8.95
Pole Position	£9.95	£8.95
Raid Over Moscow	£9.95	£8.95
Slinky	£8.95	£8.05
Snokie	£9.95	£8.95
Solo Flight	£14.95	£13.50
Solo Flight (disk)	£14.95	£13.50
Spitfire Ace	£9.95	£8.95
Spy Hunter	£9.95	£8.95
Stellar 7	£9.95	£8.95
Strip Poker	£9.95	£8.95
Super Huey	£11.95	£10.75
Taper	£9.95	£8.95
Up 'n' Down	£9.95	£8.95
Zaxxon	£9.95	£8.95
Falcon Patrol 2	£9.95	£8.95
Altair 4	£5.99	£5.35
Quasar	£5.99	£5.35
Blue Thunder	£5.95	£5.35
ATARI		
Arcadians	£6.99	£6.25
Boxer	£6.99	Half Price
Business Games	£6.99	£6.25
Chess	£6.99	£6.25
Draughts & Reversi	£6.99	£6.25
Elite	£12.99	£11.65
Lisp	£9.95	£8.95
Me & My Micro (cass. + book)	£6.99	£6.25
Monsters	£6.99	£6.25
Number Painter	£6.99	£6.25
Personal Money Management	£9.99	£8.95
Pharaoh	£6.99	£6.25
Snipper	£6.99	£6.25
Snooker	£6.99	£6.25
Sphinx Adventure	£6.99	£5.25
Tree of Knowledge	£6.99	£6.25
View Ilrom!	£30.00	£27.00
Viewsheet (rom)	£30.00	£27.00
Word Hunt	£6.99	DHar Price
Words, Words, Words	£6.99	£6.25
Football Manager	£7.95	£7.15
Incredible Hulk	£7.95	£7.15
Mystery Fun House	£7.95	£7.15
Pyramid of Doom	£7.95	£7.15
Sorceror of Claimorgue Castle	£7.95	£7.15
Strange Odyssey	£7.95	£7.15
The Count	£7.95	£7.15
Blagger	£7.95	£6.25
Bumper Bundle	£7.95	£7.15
Contract Bridge	£9.95	£8.95
Guardian	£7.95	£7.15
Chuckie Egg	£7.95	£6.25
Pharoah's Tomb	£7.90	£7.10
Kamikaji	£7.95	£7.15
Starter Pack	£12.95	£11.65
Twin Kingdom Valley	£7.95	£7.15
Happy Writing	£9.95	£8.05
Mob Rally	£9.95	£8.05
Mini Office	£5.95	£5.35
747 Flight Simulation	£9.95	£8.95
Mine Shaft	£7.95	£7.15
Micro Olympics	£5.95	£5.35
Jet Boot Jack	£8.95	£8.05
Kissin' Kousins	£4.95	£4.50
Spaceman Sid	£7.95	£7.15
Birdstrike	£2.50	£2.50
The Hacker	£2.50	£2.50
Heathrow	£7.95	£7.15
Bert Boot	£7.95	£7.15
Read Right Away 1	£7.95	£7.15
Read Right Away 4	£7.95	£7.15
Space Station Alpha	£7.95	£6.25
Ultron	£7.95	£7.15
Worgo	£7.95	£7.15
Millionaire	£6.50	£5.85
Arabian Nights	£7.95	£6.25
Royal Quiz	£12.95	Half Price
Theatre Quiz	£12.95	Half Price
French Mistress A	£9.95	£8.95
German Master A	£9.95	£8.95
Redoxats	£6.95	£6.25
Blockbusters	£7.95	£7.15
Brian Jacks Superstars	£7.95	£7.15
Eddie Kidd's Jump Challenge	£7.95	£7.15
Gladumes Castle	£7.95	£7.15
Minesheft	£7.95	£7.15
Classic Adventure	£6.95	£6.25
Adventure	£7.95	£6.25
Bumble Boe	£7.95	Half Price
Chess	£7.95	£7.15
Cheaker	£7.95	Half Price
Cyberton Mission	£7.95	Half Price
Danger UXBI	£7.95	Half Price
Draw	£7.95	Half Price
Electron Invaders	£7.95	Half Price
Escape From Moonbase Alpha	£7.95	Half Price
Felix and The Evil Wheelies	£6.95	£6.25
Felix and The Fruit Monsters	£7.95	Half Price
Frentz	£7.95	Half Price
Galactic Commander	£7.95	£7.15
Gauntlet	£6.95	Half Price
Gridrunner	£7.95	£7.15
Jet Power Jack	£7.95	Half Price
Junior Maths	£7.95	£7.15
Killer Gorilla	£7.95	£5.15
Position	£6.95	£6.25
Rubble Trouble	£7.95	£7.15
Stock Car	£7.95	Half Price
Swag	£6.95	£6.25
Swoop	£7.95	£7.15
The Mine	£7.95	Half Price
Where?	£7.95	Half Price
Which Sat?	£7.95	Half Price
Count With Oliver	£8.95	£8.05
First Steps With The Mr Men	£8.95	£8.05
Quick Thinking	£6.95	£6.25
Aces High	£9.95	£8.95
Hunchback	£7.90	£7.10
Romeo & Juliet	£6.95	£5.35
Art Designer	£7.95	£7.15
McVid	£6.95	£6.25
Gatecrasher	£6.95	£6.25
English Civil War	£8.95	£8.95
Atom Smasher	£6.99	£6.25
Birds of Prey	£6.99	£6.25
Maths O'Level Examiner	£11.95	£10.75
Blitzkrieg	£7.95	£7.15
Gunsmoke	£7.95	£7.15
Super Pool	£7.95	£7.15
Vortex	£1.95	£7.15
3D Bomb Alley	£7.95	£7.15
Alien Dropout	£7.95	£7.15
Centibug	£7.95	£7.15
Centipede	£7.95	£7.15
Chess	£8.95	£8.05
Constellation	£7.95	£7.15
Disassembler	£7.95	£6.25
Invaders	£7.95	£7.15
Mr Wiz	£7.95	£7.15
Overdrive	£7.95	£7.15
Smash & Grab	£7.95	£7.15
Stranded	£7.95	£7.15
Tempest	£7.95	£7.15
Zany Kong Junior	£7.95	£7.15
Laser Reflex	£7.95	£7.15
West	£7.95	£7.15
Dave Devil Denis	£7.95	£7.15
Snooker (Visions)	£7.95	Half Price
SPECTRUM		
Designers Pencil	£14.95	£13.50
Ghostbusters	£8.99	£8.10
Pitfall II	£8.99	£8.10
River Raid	£8.99	£8.10
Space Shuttle	£9.95	£8.95
Toy Bizzarre	£7.99	£6.25
Football Manager	£6.95	£6.25
Incredible Hulk	£6.95	£6.25
Sorceror of Claymorgue Castle	£6.95	£6.25
Strange Odyssey	£6.95	£6.25
Son of Blagger	£6.95	£6.25
Enormous Tunnel	£9.95	£8.95
Five Little Ducks	£9.95	£8.95
Hansel & Gretel	£9.95	£8.95
Mr Macs Day	£9.95	£8.95
Nine Current Buns	£9.95	£8.95
The Magic Shop	£9.95	£8.95
Chess II	£9.95	Half Price
Chess Tutor	£6.95	£6.25
Eyes of Bain	£6.95	Half Price
Galaxians	£6.95	Half Price
Golden Apple	£6.95	£6.25
Invaders	£6.95	Half Price
Mr Wongs Loopy Laundry	£6.95	£6.25
On The Dole	£6.95	Half Price
Snooker	£5.95	£5.35
World Cup Soccer	£6.95	£6.25
System 15000	£9.95	£8.95
Chuckie Egg 2	£6.90	£6.20
New Cyclon Attack	£6.90	£6.20
Beta Basic	£9.95	£8.95
Doomdarks Revenge	£9.95	£8.95
Lords of Midnight	£9.95	£8.95
Pyjaron	£7.95	£7.15
Shadowfire	£9.95	£8.95
Wizards Lair	£6.95	£6.25
Kung Fu	£6.95	£6.25
Manic Miner (Bug Byte)	£5.95	Half Price
Star Trader	£6.95	£6.25
The Castle	£6.95	£6.25
Turmoil	£6.95	£6.25
Twin Kingdom Valley	£7.95	£7.15
Masterfile	£15.00	£13.50
Masterfile & MF Print	£19.95	£18.00
Steve Davis Snooker	£7.95	£7.15
Bear George	£6.95	£6.25
Paddington Disappearing Ink	£7.95	Half Price
Paddington's Early Visit	£7.95	Half Price
Paddington Problem Picture	£7.95	Half Price
Paddington Shopping Mix Up	£7.95	Half Price
Volcano	£7.95	£7.15
Astronomer	£9.95	£8.95
Backgammon	£5.95	£5.35
Bridge Player 2	£8.95	£8.95
Bridge Tutor Advanced	£5.95	£5.35
Bridge Tutor Beginner	£5.95	£5.35
Draughts	£5.95	£5.35
Personal Basic	£8.95	£8.95
Pelaut Wizard	£5.95	£5.35
Superchess 3.0	£8.95	£8.05
Superchess 3.5	£8.95	£8.05
Supercode II	£6.95	£6.95
Supercode III	£12.95	£11.65
ZX Reversi	£5.95	£5.35
Blockhawk	£6.95	£6.25
D.M. Black Forest	£6.95	£6.25
D.M. Double Trouble	£6.95	£6.25
Delta Wing	£6.95	£6.25
Leonardo	£7.95	£7.15
Money Manager	£6.95	£6.25
Dragonpack	£5.95	£6.25
Derby Day	£5.99	Half Price
Fifth	£8.95	£8.05
Formula One	£7.95	£7.15
Great Detective	£5.95	£5.35
Handicap Golf	£5.95	Half Price
Highway Code	£5.95	£5.35
Magic Roundabout	£5.95	£5.35
Rocky Horror Show	£5.95	£5.35
Stargazer Secrets	£5.95	Half Price
Tentahawks	£5.95	£5.35
Test Match	£5.95	Half Price
War of The Worlds	£7.95	£7.15
Dungeon Master	£7.50	Half Price
Hulks of Things	£7.50	Half Price
Rommels Revenge	£7.50	Half Price
Centipede	£5.50	Half Price
Highway Code	£6.95	£6.25
Micro Olympics	£5.95	£5.35
Mini Office	£5.95	£5.35
The Magic Sword	£7.95	£7.15
Dark Star	£7.50	£6.75
Dictator	£4.95	£4.50
Fruit Machine	£4.95	Half Price
Galactisians	£4.95	Half Price
Golf	£4.95	Half Price
Invaders	£4.95	Half Price
Maziacs	£6.95	Half Price
Moder	£5.95	£5.35
Munchman	£4.95	Half Price
Personal Finance	£6.95	£6.25
The Rumes of Zendos	£7.95	£7.15
Quasar	£14.95	£13.50
Oracles Cave	£7.95	Half Price
Combat Lynx	£8.95	£8.05
Hamler Attack	£5.95	£5.35
Jungle Trouble	£5.95	£5.35
Scuba Dive	£5.95	£5.35
Airwolf	£5.95	£6.25
Dukes of Hazard	£6.95	£6.25
Fall Guy	£6.95	£6.25
Grand National	£6.95	£6.25
Kokotoni Wilf	£5.95	£5.35
911 TS	£7.95	£7.15
Backgammon	£7.50	£6.75
Beaky & Egg Snatch	£5.50	£4.95
Doomsday Castle	£5.50	£5.95
The Drive In	£7.50	£6.75
The Pyramid	£5.50	£4.95
Booty	£2.50	£2.50
Govan	£2.50	£2.50
Viking Raiders	£2.50	£2.50
Wild Bunch	£2.50	£2.50
Ballooning	£8.95	£8.95
Punchmatch Pete	£8.95	£8.95
Ruth Gold	£7.95	£7.15
Ruth Gold	£7.95	£7.15
Yaxis Race	£8.95	£8.95
Bollerhouse	£7.95	£7.15
Boulder Dash	£7.95	£7.15
Beetlecrazy	£7.95	£7.15
D Day	£7.95	£7.15
Talisman	£7.95	£7.15
Heathrow International	£7.95	£7.15
Haze Chase	£5.95	Half Price
Night Driver	£3.95	Half Price
Nightlite II	£7.95	£6.95
Technician Ted	£5.95	£5.35
3D Lunar Attack	£7.95	Half Price
C Compiler (Hi Soft)	£24.99	£22.50
Dev Pac 3 (Hi Soft)	£14.00	£12.50
Pascal (Hi Soft)	£25.00	£22.50
Ultrakit (Hi Soft)	£9.45	£8.50
Alchemist	£5.50	Half Price
Arcadia	£5.50	Half Price
Jumping Jack	£5.50	Half Price
Pedro	£5.50	£4.20
Wild Bunch	£6.90	£6.20
Zip Zap	£5.50	Half Price
Zenon	£5.50	Half Price
Confusion	£8.95	£6.25
Final Mission	£5.95	£5.35
Millionaire	£5.50	Half Price
Moon Cresta	£7.95	£7.15
Mountains of Ket	£5.50	£4.95
Temple of Vran	£5.50	£4.95
Nosferatu	£5.95	£5.35
Jewels of Babylon	£5.50	£4.95
Multi File	£9.95	£8.95
Screen Machine	£9.95	£8.95
Purchase Ledger	£14.95	Half Price
Sales Ledger	£14.95	Half Price
Stock Control	£14.95	£13.50
Animated Sam	£6.95	£6.25
The Great Space Race	£14.95	Half Price
Valhalla	£14.95	£13.50
Adventure Quest	£9.90	£8.90
Colossal Adventure	£9.90	£8.90
Dungeon Adventure	£9.90	£8.90
Emerald Isle	£9.90	£8.90
Lords of Time	£9.90	£8.90
Return to Eden	£9.90	£8.90
Snowball	£9.90	£8.90
Spy Vs Spy	£9.95	£8.95
Flight From the Dark	£9.95	£8.95
ABC Liftoff	£9.95	Half Price
Countdown	£7.95	Half Price
Snaffle	£9.95	£8.95
Wizard Wizard	£7.95	£7.15
Confrontation	£7.95	£7.15
Confrontation Scen 1	£5.95	£5.35
Confrontation Scen 2	£5.95	£5.35
Johnny Reb	£5.95	£5.35
Panzer Attack	£5.95	£5.35
Pirate	£6.95	£6.25
Redcoats	£6.95	£6.25
Special Operations	£5.95	£5.35
The Bulge	£9.99	£8.99
Blockbusters	£6.95	£6.25
Brian Jacks Superstars	£7.95	£7.15
Eddie Kidd's Challenge	£6.95	£6.25
Olympicon	£5.95	Half Price
Phoenix	£5.50	£4.95
Abersoft Forth	£14.95	£13.50
Classic Adventure	£6.95	£4.95
Hampstead	£9.95	£8.95
Halifax	£6.95	£6.25
Hobbit	£14.95	£13.50
Hurg	£14.95	£13.50
Melbourne Draw	£8.95	£8.00
Mugsy	£6.95	£6.25
Sherlock	£14.95	£13.50
Sir Lancelot	£5.95	£5.35
Starion	£7.95	£7.15
4D Tenor Daktil	£6.95	£6.25
Spreadsheet	£9.95	Half Price
Project Future	£6.95	£6.25
A Day in The Life Of	£6.95	£6.25
Full Throttle	£6.95	£6.25
Haunted Hedges	£6.95	£6.25
Jasper	£6.95	£6.25
Kentilla	£6.95	£6.25
Luna Crabs	£6.95	Half Price
3D Death Chase	£6.95	£6.25
Omnicalc 2	£14.95	£13.50
Skool Daze	£5.95	£5.35
Sky Ranger	£5.95	£5.35
Tornado	£5.95	Half Price
Air Traffic Control	£5.95	£5.35
Auto Mania	£6.95	£6.25
Everyone's A Wally	£9.95	£8.95
Pyjamarama	£6.95	£6.25
The Witch's Cauldron	£6.95	£6.25
Alien	£9.95	£8.95
American Football	£9.99	£8.99
Caesar The Cat	£8.95	Half Price
First Steps	£8.95	£8.05
Quick Thinking	£6.95	£6.25
Star Seeker	£9.95	£8.95
Espionage	£9.95	£8.95
Erik the Viking	£9.95	£8.95
Machine Code Tutor	£14.95	£13.50
Squash	£7.95	£7.15
Trashman	£5.95	£5.35
Lightmagic	£14.95	£13.50
Machine Lightning	£19.95	£17.95
Basic Mac Man	£14.95	£13.50
White Lightning	£14.95	£13.50
Armagedon	£5.95	Half Price
Daley Thompson	£6.90	£6.20
Gift from the Gods	£6.95	£6.95
Hunchback II	£6.90	£6.20
Kong Strikes Back	£6.90	£6.20
Match Day	£7.95	£7.15
Mr Wimpy	£5.90	Half Price
Pogo	£5.90	£5.30
Royal Birkdale	£5.90	£5.30
Address Manager Standard	£8.95	£8.05
Address Manager Plus 80	£19.95	£17.95
Casino Royal	£5.95	£5.35
Editor Assembler	£12.95	£11.65
Finance Manager Standard	£8.95	£8.05
Finance Manager Plus 80	£19.95	£17.95
Machine Code Test Tool	£9.95	£8.95
Stock Manager Standard	£8.95	£8.05
Stock Manager Plus 80	£19.95	£17.95
VAT Manager Standard	£8.95	£8.05
VAT Manager Plus 80	£19.95	£17.95
Video Pool	£6.95	£6.25
The Forest	£9.95	£8.95
Editor & Assembler	£6.50	£7.65
Spectrum Monitor	£7.50	£6.75
Factory Breakout	£5.50	£4.95
Paint Plus	£9.95	£8.95
Screen Machine	£6.25	£7.40
Mission 1	£7.95	£7.15
Airliner	£5.95	Half Price
Hunter Killer	£7.95	£7.15
Battle for Midway	£9.95	£8.95
Hopper	£5.95	Half Price
Aquaplane	£7.95	£4.95
Bugaboo	£6.95	£6.25
Dragonbane	£6.95	£6.25
Eric Bristow's Pro Darts	£6.95	£6.25
Fred	£6.95	£6.25
Games Designer	£14.95	£13.50
Meteor Storm	£5.95	Half Price
Word Processor	£6.95	Half Price
Cash IQ Test	£6.95	£6.25
Frogger	£5.95	Half Price
Wonder Bender	£5.95	£5.35
3D Starstrike	£5.95	£5.35
3D Tank Duel	£5.95	£5.35
Apocalypse	£9.95	£8.95
Trans Express (cass.)	£8.95	£8.95
Trans Express (mint)	£14.95	£13.50
Wingler	£5.95	£5.35
Tolaris	£7.95	£7.15
Asimuch Calibration	£5.95	£5.35
Infernoy	£6.00	£5.85
Infernoy	£8.95	£8.95
Backgammon	£5.95	Half Price
Borkythess	£5.95	Half Price
Capitol Letters	£7.95	Half Price
Castle Spellevous	£7.95	£7.15
Chequered Flag	£7.95	Half Price
Chess	£7.95	Half Price
Chess Tutor	£3.95	Half Price
Club Record Controller	£6.95	Half Price
Collectors Pack	£6.95	Half Price
Elite Teacher	£7.95	£5.35
Early Punctuation	£7.95	Half Price
English Literature	£6.95	Half Price
Espionage Island	£6.95	Half Price
Fright Simulation	£6.95	Half Price
Glider	£3.95	Half Price
History	£6.95	£5.35
Horace & The Spiders	£6.95	Half Price
Horace Goes Skiing	£5.95	Half Price
Hungry Horace	£6.95	Half Price
Ince Curse	£6.95	£5.35
Inventions	£6.95	Half Price
Learn to Read 1	£3.95	Half Price
Learn to Read 2	£3.95	Half Price
Learn to Read 3	£5.95	Half Price
Learn to Read 4	£5.95	Half Price
Learn to Read	£6.95	Half Price
Make a Chip	£3.95	Half Price
Marsh Rescue	£7.00	£7.15
Musicmaster	£3.95	Half Price
Planet of Death	£6.95	Half Price
Print Utilities	£3.95	Half Price
Reversi	£7.00	£7.15
Scribble	£15.95	Half Price
Ship of Doom	£6.95	Half Price
Small Business Accounts	£12.95	Half Price
Speech Maths	£7.95	£7.15
Stop The Express	£6.95	£6.25
Theatreland	£9.95	Half Price
The Apostrophe	£7.95	£7.15
Wu Cale	£6.95	Half Price
Vu File	£8.95	Half Price
Vu Stat	£8.95	Half Price
Zeus Assembler	£12.95	Half Price
ZX Forth	£12.95	Half Price
Astronut	£14.95	Half Price
Jet Set Willy	£5.95	£5.35
Learning with Leeper	£5.95	£8.95
Lode Runner	£5.95	£5.35
Manic Miner	£5.95	£5.35
Death Star Interceptor	£7.95	£7.15
Tasscopy	£8.90	£8.90
Transkwik	£10.90	£9.90
Tasprint	£9.90	£8.90
Taswide	£5.50	£4.95
Tasword Two	£13.90	£12.50
Tasword Rescodaxe	£7.95	£7.15
Gilligan	£7.95	£7.15
Alien 8	£9.95	£8.95
Aric Aloe	£5.50	£4.95
Cookie	£5.50	Half Price
Jetpac	£5.50	£4.95
Knight Lore	£9.95	£8.95
Lunar Jetman	£5.50	£4.95
Sabre Wulf	£9.95	£8.95
Trans Am	£5.50	£4.95
Underwurlde	£9.95	£8.95
Beach Head	£7.95	£7.15
Blue Max	£7.95	£7.15
Bruce Lee	£7.95	£6.25
Raid Over Moscow	£7.95	£7.15
Spy Hunter	£7.95	£7.15
Zaxxon	£7.90/5	£7.15
Racing Manager	£6.95	£6.25
Strangleloop	£5.95	£5.35
The Biz	£7.95	£7.15
The Island	£.95	£5.35
Moon Buggy	£6.95	Half Price
Snooker	£8.95	Half Price
1994	£6.95	Half Price
Android Two	£5.95	Half Price
Cyclone	£6.95	£6.25
TLL	£2.95	£2.50
Blue Thunder	£5.95	£5.35
Howzat	£5.50	£4.95

"NEVER DID TRUST THAT SINCLAIR"

THE SINCLAIR CYNICS have turned full circle. They sneered at his first sub-£100 ZX-80 five years ago, and now they're back rubbing their hands in glee at the first major financial crisis to face him in five years' home computing.

Between the early black box days and the blacker months of early 1985 they jostled to talk to him and listened avidly to his Cromwellian views on *Question Time*. Now they seem to have conveniently forgotten that it was Sinclair who turned the U.K. into the most sophisticated computer market in Europe.

Of course the delayed-delivery and reliability problems that have beset all his machines have left a mark in people's minds, but his achievement in giving Britain more computers per capita than any other country mustn't be played down.

The disasters that have hit other home computer companies — Acorn, Oric and Dragon — have made his search for £10 million to £15 million for "financial reconstruction" particularly difficult; and the C-5 electric bidet hasn't done much to help. Despite the politicians' and the City's often confessed undying love for new technology, they run a mile when faced with the real thing. They'd rather invest in cabbages than computers.

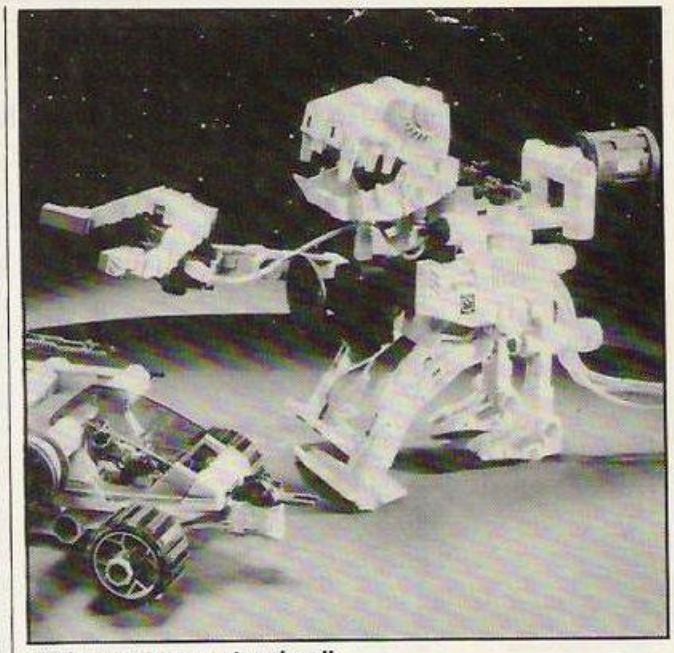
Behind Sinclair's cash crisis lie many reasons, some common to all computer manufacturers, others unforseeable. Christmas was bad everyone agrees, but nobody thought it was as bad as the £30 million of unsold Sinclair stocks seem to show.

The main obstacle between Sinclair and a flow of new funds is the understandable fear that he has become a one-product company — the Spectrum. And many believe that even that machine is well past its money-making heyday as it celebrates its third birthday in a quiet summer.

Sinclair's hopes are pinned on summer pocket TV sales balancing up the computer market's lopsided Christmas booms. He still believes the QL will make its long-awaited impact — he's planning to give a September release to a half megabyte wafer-scale technology disc drive for it.

Apart from red faces in the highest places in the land, Sinclair's difficulties may at least show that new technology is perhaps not such an easy solution for rebuilding the nation's wealth.

Editor: TOBY WOLPE: **Assistant Editor:** MEIRION JONES; **Production Editor:** IAN VALLELY; **Software Editor:** SIMON BEESLEY; **Commercial Software Editor:** PAUL BOND; **Editorial Assistant:** LEE PADDON; **Editorial Secretary:** LYNN DAWSON. Editorial: 01-661 3144. **Advertisement Manager:** NICK RATNIEKS 01-661 3127; **Assistant Advertisement Manager:** KEN WALFORD 01-661 8548; **Senior Sales Executive:** JULIAN BIDLAKE 01-661 8458; **Advertisement Executive:** KAY FILBIN 01-661 8484; **Northern Office:** GEOFF PARKER 061 872 8861; **Advertisement Secretary:** MAXINE GILL; **Classified:** SUSAN PLATTS 01-661 3036; **Publisher:** GAVIN HOWE; **Group Advertisement Manager:** SHOBHAN GAJJAR. Your Computer, Room L221, Quadrant House, The Quadrant, Sutton Surrey SM2 5AS. © Business Press International Ltd 1985. Printed in Great Britain for the proprietors Business Press International Ltd, Quadrant House, The Quadrant, Sutton, Surrey SM2 5AS. Tel: 01-661 3500, Telex/grams: 892084 BIPRESG ISSN 0263-0085. Printed by Riverside Press Ltd, Whitstable, Kent, and typeset by Instep Ltd, London EC1. Subscriptions: U.K. £14 for 12 issues. ABC 131, 769 July-December, 1984.



"Take me to your teacher."

CHALKIE ROBOTIX

ACTION MAN lookalike Gaxon Graves is teaching Welsh 10-year-olds Logo with the help of his control vehicle Robotix.

Robotix is a £60 construction kit including four motors, five channel control and 100 parts which kids can use to construct 10 different vehicles and robot arms. In America, where Milton Bradley has been selling Robotix for a year, it is already available with an Apple interface and software. Now David Wharry of the Micro Electronics Programme and Patrick Drewett, a teacher at Coed Eva Junior School, Cwmbran, are experimenting with Robotix kits linked through a Deltronics controller to BBCs to teach the principles of problem solving, control and technology.

MSeXtra res

PRIVATELY MSX computer makers are showing off the new extended specification MSX-E micros with 512×192 resolution, 80-column text display, 256 colours and nine-voice sound which will go on sale in Japan this autumn. Publicly in Britain the likes of Sony, Toshiba and Mitsubishi insist that they will be selling only the existing under-specified over-priced MSX machines until after Christmas.

Toshiba, which has sold more MSXs than anyone else in Britain, unveiled its MSX-E, HX-23 and HX-22 micros at the consumer electronics trade shows in London last month. The 23 has 80K of video Ram and can interface to a video disc player. JVC also showed their current MSX hooked up to a video disc running a demonstration golf game. As promised at the MSX launch, MSX-E retains upwards compatibility — it will run all existing MSX software — although, of course, new programs written to take advantage of the expanded MSX-E graphics and sound capabilities will not be downwards compatible.

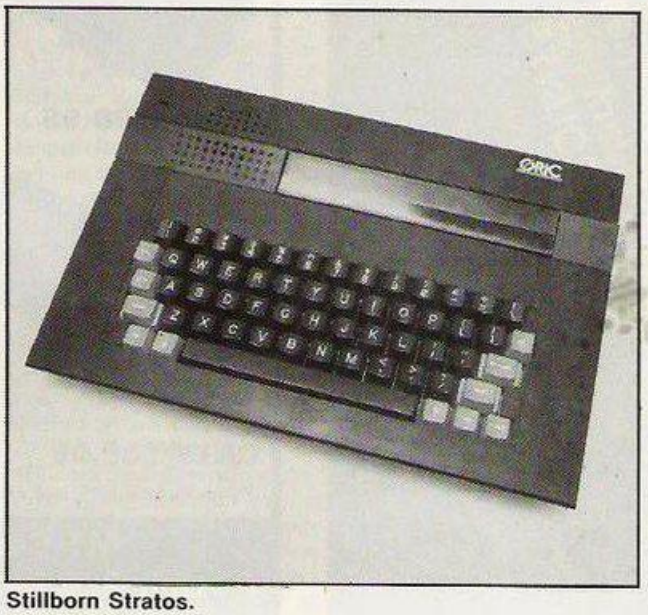
In Japan MSX-E machines will start at around £350 — although some will include a built-in disc controller. Others may go further — Spectravideo is building in a complete disc drive.

EUREKA FOR ORIC
Normans conquer Atmos

EUREKA INFORMATIQUE, which distributes British computers in France, has bought Oric for several hundred thousand pounds and will move production of Atmoses to its computer peripheral plant in Normandy later this month.

Oric, which announced its Spectrum-bashing 16 and 48K Oric 1 at the end of 1982 suffered repeated financial crises and uncertainty which prevented it from competing successfully with Sinclair in Britain, although as Jean-Claude Talar, Eureka President points out it "enjoyed a good reputation in France".

Earlier this year Oric had to finally call in the receiver who has sold all rights to Oric's future plans for home micros including the Stratos and a 68000 based machine, as well as substantial stocks of components, half-built, and completed Atmoses to Eureka. Oric's other assets, including chip designs for an ultra low-cost IBM compatible will be sold elsewhere. Initially Eureka intends to assemble Orics in Normandy, until the stockpile of components runs out, and sell them in France.



Stillborn Stratos.

In August or September, Eureka will decide whether to go ahead with Stratos, a 64/128K micro with a built-in disc interface and perhaps modem, and whether to go back into the British market.

British Oric owners lost their warranties when the company crashed but Eureka will be announcing details of a new support service for software, repairs and peripherals next.

WE'RE ALL GOING ON A CBM HOLIDAY

COMMODORE ENGINEERS from Britain and Europe flown to California to see the Amiga are impressed with the graphics. CBM's new 68000-based micro will hit the U.K. in 1986 and its £1,200 price includes a 3.5in Sony disc drive and a two-button mouse.

But the graphics chips will appear in future Commodore home computers. Resolution is better than TV quality — up to 1024×800, and 4096 colours all available through a GEM-like operating system. You can have five windows on screen with 16 colours in each. Amiga also has a built-in synthesiser to sound the battle cry against Tramiel's "Saint".

Commodore is also offering free trips to anyone who will take a CBM-64 off their hands this summer. For £199 you will get a 64, C2N Data Recorder, a brilliant game — International Soccer — and three days free accommodation at one of 250 hotels in Britain and Europe. A Commodore front man was able to reassure the unduly cynical that you would have some choice "the hotels are not all in Sutton or Albania". The Plus 4 is being packaged with a 1541 disc drive, MPS 801 printer and Inpec business software for £450.

Chicago price tag for 128 was $300.

Atari 520 not out CPC 128 declared

YORKIE MAN Alan Sugar sold us a dummy last month when he launched his disc-based CPC 664 without the extra Ram we'd predicted. But now the Amstrad 128 has appeared — in Chicago at the Consumer Electronics Show.

Enterprise, meanwhile, has named the price for its 128K micro which has 113K user memory and is 30 percent faster than, yet compatible with, its 64K cousin. Companies like U.S. Gold, Ocean, and Domark with its new James Bond game, are now writing Enterprise versions. The 128K micro will cost £250 while the 64 drops to £180 — that for a machine with 672×512 resolution.

Down in Slough, Atari's first batch of STs — only 520 of them oddly enough — are now with software houses and the like. First consumer deliveries should be through Atari loyalists Silica shop in Sidcup.

Remember Harold in 1066 Maggie

NOW THAT Halley's Comet is almost within range for amateur astronomers, Eclipse Software's £7 prediction program for the Spectrum can show you where in the sky to find it — for any time, date and latitude — important because many comet watchers may flee south to Australia for the best view of the giant snowball as it becomes visible to the naked eye late this year and early in 1986.

Gooch out for 64

ENGLAND V AUSTRALIA without having to worry about the mortal remains of Lord Darnley's stump. Gooch's Cricket, £10 from Audiogenic, puts batsmen and bowlers alike at the mercy of your joystick.

MICRO-EXPORT

SINCLAIR
ACT, COMMODORE
ACORN, MSX, ATARI, ETC

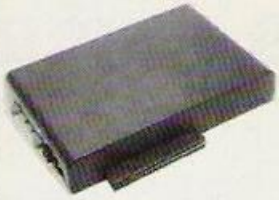
We export Microcomputers and Peripherals to all Countries Any make. Any Quantities BIG DISCOUNTS

send for comprehensive price list to:
Dept. EE
MICRO-X LTD
765-767 HARROW ROAD, LONDON NW10 5NY
TELEPHONE 01-968 6622 TELEX 915866 MICROX G

SPECTRUM™ USERS!

LMT

Access



The LMT-SPD1 DISK and PRINTER interface connects to standard BBC type 5¼" floppy drives and any parallel printers. LOAD and EDIT programmes in seconds with EASY BASIC commands. e.g. LOAD* "GAME" — FORMAT, CAT, SAVE, VERIFY, MERGE, ERASE, MOVE, LLIST, LPRINT and COPY are ALL supported. Uses no MEMORY-FREE utilities DISK and DISK CABLE supplied.

ONLY £79.95

The LMT-68FX2 KEYBOARD is excellent value, with 68 keys and many SINGLE ENTRY functions, plus NUMERIC PAD. The SIZE, Design, Layout and FEEL make typing a pleasure and turn the SPECTRUM™ into a REAL Computer.

ONLY £39.95

Prices include VAT and carriage

MT Computers Ltd.
Unit 2, 274 Baker St, Enfield,
Middlesex EN1 3LF
Tel: 01-367-0035

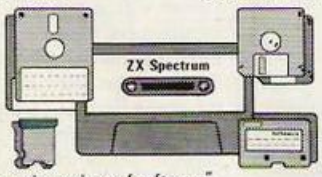
ROMANTIC ROBOT *present*

New!

TRANS-EXPRESS 85.2

The only fully automatic and professional utility for transferring Spectrum programs from:

① CARTRIDGE to CARTRIDGE or DISC to DISC or WAFER to WAFER
② TAPE to CARTRIDGE or DISC or WAFER
③ TAPE to TAPE
④ CARTRIDGE to TAPE



"An ingenious piece of software."
"••••• Features ••••• Performance" PCN
"A valuable utility for microdrive users." Sinclair User
"HIGHLY RECOMMENDED" PCN

NEW! Part ② now fully automatic - you just START/STOP the tape - transfers, modifies, relocates, re-structures & helps to RUN also hyper/turbo, headerless, extra-long (including 48K) parts, etc.
The best possible success ratio, the easiest & fastest in use.

Wriggler

A CRASH SMASH

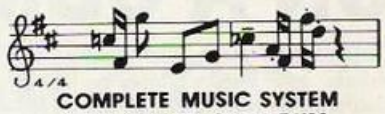
A novelty maze arcade game. Superb graphics and action. An extensive map, over 250 locations, full of features and creatures unseen as yet. New, funny, addictive, compelling.

Plus a bonus on side B: THE MOONS OF JUPITER

'A WINNER.' PC Weekly
'A Star Game.' PCN

New!

MUSIC TYPEWRITER 85



COMPLETE MUSIC SYSTEM FOR THE ZX SPECTRUM

"A very professional piece of programming, easy to use, excellent screen presentation, error trapping and helpful prompts." ZX Computing
"Extremely user friendly lets you get started within minutes." Crash
"The notation has to be seen to be believed."
"Puts many expensive professional systems to shame." Your Spectrum
"Excellent aid to teaching the basics of music." Which Micro? "Great fun" The Listener
"If you are interested in music and own a computer then get it." ZX Computing

NEW! Sheet music quality printout on dot matrix printers NEW!
Microdrive compatible
NEW SUPPLEMENT for £4.95 – DATA CONVERTER to use music in your own programs - MICRODRIVER puts MT onto m/drives. NEW!

Please send SAE for details. Trade enquiries welcome. Deliveries normally by return.

I enclose a cheque/PO for £..... (European orders please add £1 overseas £2)
or debit my Access VISA No
Name..... Card expiry.....
Address.....
.....
Signature..... Date.....

Please send me (tick as applicable)

MUSIC TYPEWRITER	£9.95 ☐	WRIGGLER	£5.95 ☐
TRANS-EXPRESS:		MT Supplement	£4.95 ☐
all parts on tape	£9.95 ☐	part ③ only	£5.50 ☐
①+② on tape	£7.50 ☐	or cartridge	£14.95 ☐
		or Rotronics wafer	£12.95 ☐

Updates of TRANS-EXPRESS or MUSIC TYPEWRITER £3.50 ☐
TRANS-EXPRESS upgrades from tape to cartridge £6.95 ☐

ROMANTIC ROBOT 77 Dyne Road London NW6 7DR ☎ 24 hrs Access VISA orders 01-625 9463 ☎ YC

DIARY

IF YOU ARE privileged enough to walk around Acorn's corridors of power and hear a cry of Alex Uboldi, it is probably not a comment about worried looking Chairman Alex Reid's rapidly thinning hair. Alex has much to worry about, what with the share price at an all time low of 9p, rumours of disaffection from Chris Curry, and PR firm Quentin Bell ditching Acorn because the company had so little to publicise. Olivetti has now put in an Italian, Alex Uboldi, as Managing Director of Acorn.

TRAMIEL still managed to surprise Chicago by launching the 260ST after all, at the Consumer Electronics Show. 256K Ram with a built-in 500K Sony drive and a black and white monitor will cost $500.

STILL AT CES, rival British software houses seen dragging bags full of cash around as they try to gazump each other bidding for U.S. blockbusters. Wary of disappearing British companies, the Americans are demanding, and getting, six-figure royalties for their games with up to $50,000 up front.

SOMEONE AT ULTRATEC has just discovered rude words and for some reason has decided to fill the loader program of the AMSDISK tape to disc utility which they sell, with abuse.

We heard about it from J. Shaw, whose 11-year-old daughter was given Amsdisk on her birthday. She called him in after listing 70 lines of abuse which include the line "I've left Basic unprotected to let people see these f***ing comments". Now Shaw, who tells us that his occupation allows him "access to computer files" and that he has "given the tape to my superiors for a decision to be made regarding prosecuting" has sent a copy of the offending lines to the Trading Standards Office.

We cannot guarantee that anyone who sends money to Ultratec will now be sent anything in return while an investigation is carried out into the legality of sending obscene listings through the post.

Elsie Dee

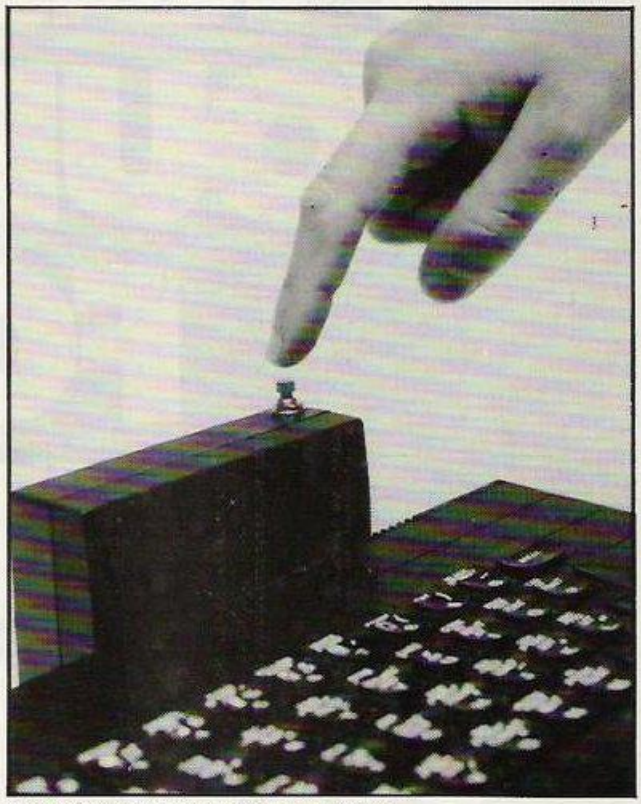
DON'T TOUCH

Software industry at risk

"DON'T TOUCH" is the advice Tim Langdell of the Guild of Software Houses is giving to anyone tempted to use Evesham Micros Interface III to copy software tapes. One touch of the button once you have loaded the program and the Interface III dumps the whole contents of a Spectrum's memory onto microdrive, evading all the protection devices so far developed for commercial software.

Evesham advertises the unit for making back-up tapes but Roger Tuckett of the Federation against Software Theft points out that the William Powell Computer Copyright Bill should become law this month and then making back-ups other than for research and private study — which is narrowly defined will be a breach of copyright. Selling copies is punishable by fines and imprisonment. Tuckett condemns "companies like Evesham Micros which sell machines under the guise of making back-ups."

Longdell does not believe that there is any such thing as an innocent copy. "I have never found the need for a back-up — you have to do something extreme to a tape, like dropping it near a magnet or letting the dog chew it." If a program does not load as easily on the 1,000th occasion as it did on the first, GOSH believes that the software house should replace it.



A crime is about to be committed.

Up until Interface III, better software protection had made it more difficult to break into programs while speed loaders had reduced tape to tape copying. A new wave of piracy could be the last straw for ailing software houses.

PLUS, TV AND PRINTER £200

Sinclair tries to wake up Spectrum sales.

SINCLAIR IS BUNDLING up a Spectrum, flat screen TV, ZX Printer and software including Vu 3D, Chess and four other games for £199 in a summer offer through Dixons. Although you cannot use the £100 miniature screen with your micro — it has no aerial socket — Sinclair's reasoning is that a go-anywhere TV is the sort of product that will appeal in the summer when computer sales are otherwise at their lowest.

Brussels spurs cards

IN THE WAKE of the Brussels European Cup soccer disaster, football clubs are starting to take Sperry's idea for providing computer identity cards for fans to curb hooliganism seriously. Chelsea is signing up and Stockport, Bournemouth and Reading, amongst others are considering similar systems. Although the scheme has been written off as unworkable by Ted Croker of the FA and Chief Constable Anderton of Manchester, small First Division clubs like Luton and Oxford which plan to ban all away fans from league matches might find the Sperry Systemsolve plan effective.

PREPARE YOURSELF FOR THE HIGHWAY ENCOUNTER.

APPROACHING FAST...

BRAIN-BLOWING GRAPHICS...MEGA-BLASTING POWER...FAST-ACTION PLAYABILITY...
'HIGHWAY ENCOUNTER'...A TOTALLY NEW DIRECTION FROM VORTEX.

ONCE YOU'RE ON IT...THERE'S NO TURNING BACK.

· HIGHWAY ENCOUNTER FOR SPECTRUM 48K · £7.95 ·

VORTEX SOFTWARE (SALES) LIMITED. VORTEX HOUSE, 24 KANSAS AVENUE, OFF SOUTH LANGWORTHY ROAD, SALFORD M5 2GL.

POP★TOPS

TOP 20

1	World Series Baseball	Imagine	Sp
— 2	Booty	Firebird	Sp
3	Softaid	Ethiopia Appeal	Sp
4	Wild Bunch	Firebird	Sp
5	Shadow Fire	Beyond	Sp
6	Brian Jacks Challenge	Martech	Sp
7	Grand National	Elite	Sp
8	Dragon Torc	Hewson Consultants	Sp
9	Gyron	Firebird	Sp
10	Everyones a Wally	Microgen	Sp
11	Match Day	Ocean	Sp
12	Arnhem	CCS	Sp
13	Starstrike	Realtime Software	Sp
14	Gremlins	Adv International	Sp
15	Death Star Interceptor	System 3	Sp
16	Minder	D.K'tronics	Sp
17	Jonah Barringtons Squash	New Generation Software	Sp
18	Overdrive	Superior Software	El
19	Bumper Bundle	Alligata	El
20	Alien 8	Ultimate	Sp

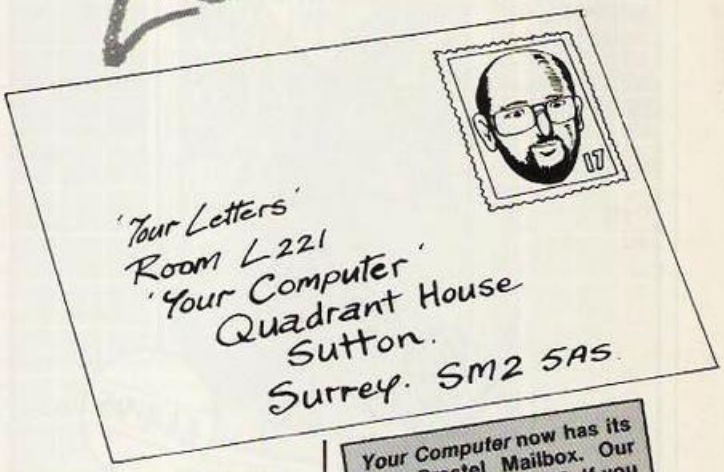
Sp = Spectrum El = Electron
Source = WH Smiths.

TOP 3 BY MACHINE

1	R.I.P.	M. Tronic	Vc
2	Rockman	M. Tronic	Vc
3	Mickey the Brickey	Firebird	Vc
1	Basketball	CBM	64
2	Gates of Dawn	Virgin	64
3	Chiller	M. Tronic	64
1	Starion	Mel. House	Sp
2	Booty	Firebird	Sp
3	Bruce Lee	US Gold	Sp
1	Football Manager	Addictive	Bc
2	Wizardore	Imagine	Bc
3	Elite	Acornsoft	Bc
1	Bruce Lee	US Gold	At
2	Spitfire Ace	US Gold	At
3	Fort Apocalypse	US Gold	At
1	BMX Racers	M. Tronic	16
2	Exorcist	CBM	16
3	Wizard & The Princess	Mel. House	16
1	Overdrive	Superior Soft	El
2	Elite	Acornsoft	El
3	Football Manager	Addictive	El
1	Ghost-busters	Activision	Am
2	Combat Lynx	Durell	Am
3	Decathlon	Ocean	Am
1	Ghost-busters	Activision	Ms
2	Crazy Golf	Mr Micro	Ms
3	Jet Set Willy	S. Projects	Ms

Vc = Vic 20 64 = CBM 64 Sp = Spectrum Bc = BBC At = Atari 16 = CBM 16 El = Electron Am = Amstrad Ms = MSX.
Source = Websters Software.

YOUR Letters



MAXAM IS VINDICATED

MAY I reply to Nick Godwin's attack on our products printed in June's Letters Page.

Our policy is simple. We find it morally unacceptable to market software knowing that it does not perform to the advertised specification. We are grateful to any customeer who can substantiate their claim that a program contains a bug. In such instances, or where tape duplication is faulty, we replace it without quibble. As features have been added to MAXAM upgrades have been offered to old customers.

Now to Mr. Godwin's two-pronged attack. He wrote to us in March praising the product and with a request to 'borrow' a Rom version, after mentioning a couple of mythical bugs. These bugs do not and have never existed — even in the earliest production copies. Bugs as serious as those reported by Mr. Godwin would have been spotted months ago by the 5 in-depth magazine reviewers, the dozen or more leading software houses and the 500 plus owners of the various versions of MAXAM!

His second, rather more insidious attack on my marketing strategy, together with his pontificating on the merits of a Rom-based utility at all, show an alarming degree of general ignorance for a man in charge of a user-club newsletter! Our marketing strategy is based on factual information, and in support I can refer you to the June edition of *Amstrad Computer User*, containing a detailed article writen by someone rather more clued in than Mr. Godwin.

David Fisk,
Arnor Limited.
London SE25.

***Editorial comment:** We find David Fisk's reply wholy convincing. A number of readers have confirmed that Arnor's cassette-based assembler is bug-free, and, indeed, an excellent program. As for the Maxam Rom we stand by the judgement of our May review that "this looks like a product no serious Amstrad user can afford to be without."*

SLOPPY PROGRAMS

I REALLY CAN'T let you get away with your article in May's First Bytes, entitled Elegant Programming. I cannot fault the third or the first program — in either version — but two out of six is not enough for programs of this size.

The first thing that a beginner must learn about loops is that you should not jump out of them. Some Basics are more tolerant of this than others, and with all of them it will be forgiven in a very short program, but it is surely something that any programmer must discipline himself to avoid. Program 2 gives the game away. Line 20 reads:

```
20 IF L=7 THEN ?"SEVEN":
   L=10:GOTO40
```

The whole point is that by making L=10 you do not need the Goto. The program will leave the loop naturally — and more quicky. In program 5

```
IF D$="ORANGES"THEN60
```

should be changed to

```
THEN L=5
```

for the same reason.

Program 4 has no semicolon between "Countdown" and CD. I am aware that you don't need one on the Apple, but most computers would crash here.

Program 6 is more spectacular with two jumps out of a loop, an error in line 50 that would produce the opposite statement to that required if it ever got there. On most computers it is unlikely to do so, as the Mid$ will have to read beyond the end of the string. Line 30 should be

```
FOR L=1 TO LEN(A$)-2
```

and line 50 should start

```
IF L=LEN(A$)-2
```

if we must do it that way. Better to omit line 50 and add 65

```
?"NO MATCH":END
```

I took Program 1 to heart. I am sloppy. Whether you put Next or Next D is a matter of style. The former saves space and is quicker, the latter is more readable. I did not think one was wrong and the other right. But I have taken the message to heart, and decided that I would rather be sloppy than elegant.

Geoffrey Childs,
Winchcombe,
Gloucestershire.

Your Computer now has its own Prestel Mailbox. Our number is 019991800. If you have any program enquiries send us a message. We will try and give you an answer within a few days.

SPECTRUM TIPS

SPECTRUM owners may like to use some of my routines.

```
POKE 23659,0
```

makes the Spectrum crash if anything is printed in bottom part of the screen. e.g. error messages or breaks.
(To disenable this routine use Poke 23659,2)

```
PRINT USR 0
```

Completely clears the memory. (New only clears the Basic)

(continued on page 19)

'AMSTRAD CPC 664 IS OK'

MAY I be so bold as to suggest that Mr Lee Paddon takes a driving lesson or two before he tries to rev up another computer.

I noticed in the review he did of the Amstrad CPC-664 several unfortunate mistakes. These errors could I suppose influence potential purchasers of this fine machine into looking elsewhere.

For a start the 3in. discs have when formatted for a CPM system disc 169k, or as a Data disc i.e. no CPM 178k or in IBM format 154k. Additional to the free space is a 2k directory on each side.

A renumber command is included in the Basic.

With regard to the Warm Reset, what point is there in a warm reset if you have very good On Break Gosub protection. And if one were to read the manual it details how to define a function key to reset the mode and colours etc.

All in all I suppose it was a reasonable review but for the fact of the above errors.

S. Potter,
Brinsley,
Nottinghamshire.

LIGHTMAGIC
GRAPHICS DESIGNER

£14·95

Lightmagic is the ultimate graphic design package giving you the ability to create stunning graphics and complete illustrations at your fingertips.

Now you can produce and edit complete screens and pictures. Use Lightmagic as a fascinating program in itself or as an exciting new dimension in your games and programming.

Just look at these features!

- ✱Fully integrated screen editor and UDG designer.
- ✱Drawing with pens.
- ✱Painting with brushes – 10 different effects in 20 sizes.
- ✱Illustrating with airbrush.
- ✱Cut and paste facility.
- ✱Lettering in upper and lower case characters, also double height facility.
- ✱User Defined Graphics – Choose from 147 pre-set graphics or define your own.
- ✱UDG Designer for creating and editing up to 7 sets of User Defined Graphics.
- ✱Facilities to mirror, invert, copy, move, enlarge, fill, rotate, etc.

A comprehensive manual with worked examples, gives you a step by step guide to Lightmagic through every stage of screen composition.

Full facilities are provided for tape storage of finished pictures and UDG's, together with a temporary memory storage facility.

So enter Lightmagic and start designing today!

For 48K Spectrum and Spectrum +

The Complete Machine Code Tutor

NOMINATED FOR BRITISH MICRO COMPUTING AWARDS 1985

£14·95

Specially written for BASIC programmers finding the prospect of machine code rather daunting!

Now there's a straightforward way to learn all about machine code and its many applications.

Here are just a few of Machine Code Tutor's many features:

- ✱A complete machine code tutorial on two cassettes with up to 100K of data depending on machine type.
- ✱Between 27 and 35 progressive lessons depending on machine type.
- ✱Full explanatory simulator – displays relevant registers and flags and their effect on the processor.
- ✱Runs a series of exercises for continuous assessment of your progress which can be modified or substituted.
- ✱No matter how much you experiment the safeguard system prevents crashing of the program.
- ✱Automatic error checking.
- ✱All machine code instructions are dealt with throughout the program and in the accompanying manual.
- ✱Comprehensive reference manual.

Machine Code Tutor really is the most complete instructor around. Learn from your computer rather than a book, and do it at your own pace.

Using the tutor you should be confident of writing complex machine code programs by the time you finish your last lesson.

For 48K Spectrum and Spectrum + Commodore 64 BBC Model B 32K Atari AND NOW Amstrad CPC 464

New Generation Software

Lightmagic and Machine Code Tutor are available from all good stockists, or direct by filling in the coupon below and returning to:
New Generation Software Ltd., FREEPOST, Bath BA2 4TD. For instant despatch phone your order now on 0225 316924 quoting your Access or Barclaycard number.

GSH

Please send me _____ Lightmagic(s) at £14.95 each, and _____ Machine Code Tutor(s) for the _____ Computer at £14.95 each. P&P FREE.

I enclose my cheque/postal order made out to New Generation Software Limited for £ _____ Cheque/Postal Order No. _____

Name _____ Address _____

Card No. _____ Signature _____ New Generation products are sold according to their terms of trade and conditions of sale.

VISA

YC17

IN ★ TOUCH

How to write for *Your Computer*

We called this magazine *Your Computer* precisely because we welcome your views, tips and hints and even your criticisms of machines and software in general. Here's how you go about getting your name into print. Your article should be typed, double-spaced, on A4 paper. A name and address on each sheet would help. Don't forget to tell us which machine it runs on. With programs please include a cassette or disc and some indication of how long it is. Please put what machine it's for on the envelope. Don't forget full instructions to us how to load and list your program and how to enter it for the readers.

The article must be submitted exclusively to *Your Computer*. We pay £35 per published page — that's as it appears in the magazine and includes illustrations.

Telsoft

Telsoft is *Your Computer's* software downloading service. Any program for the Spectrum or the BBC — and soon the Commodore — which has a telephone symbol next to it is available on the service. Both 1200 and 300 baud speeds are catered for. For more details call Colchester (0206) 8068. No more lonely nights typing in endless pages of hex digits.

Message service

You can get messages to us in two ways. Either use the Prestel Telex Link to 892084 BISPRES G or you can use our very own modem, day or night on 01-661 8978. The modem is V21, 300 baud, even parity, 10 bits per character. You simply transmit in upper case "YRC" — our address code, and wait for the acceptance code "+ + + STF GO". Then off you go. Don't forget to tell us who it's for. Sign off with "NNNN" — again in upper case.

YOUR Letters

(continued from page 17)

```
9000 FOR f = 1 to LEN a$:PRINT
A$(f);:BEEP .05,0:NEXT f:RETURN
```

prints text newsflash style. It is meant to be used as a sub routine. To activate use LET a$ = "message to be printed.", then set the printing variables. For example:

```
PRINT AT x,y;
```

and

```
GOSUB 9000
```

I have noticed that the Spectrum has a facility to convert binary numbers to decimal but it doesn't have anything to convert decimal numbers to binary, so I have written a routine to serve this purpose. Poke the decimal number that you want to convert into location 16384, then run this routine:

```
1 LET a$ = "":FOR f = 0 to 7:LET
a$ = a$ + STR$(POINT(f,175):NEXT
f:PRINT a$:STOP
```

Neil Braganza,
Nailsea,
Avon.

SPRITES BUG

I HAVE just discovered a bug in the listing for my Sprite Basic article in the June issue which prevents the two commands !Break On and !Break Off from operating correctly. However, the bug can simply be cured by loading the machine code, and then running this program:

```
10 FOR J = 62780 TO 62650 STEP
-1
20 POKE J + 21,PEEK J: NEXT J
30 FOR J = 62650 TO 62670
40 READ N: POKE J,N: NEXT J
50 DATA 7,98,114,101,97,107,111,
110,166,237
60 DATA 8,98,114,101,97,107,111,
102,102,175,237
70 POKE 60136,208
80 SAVE "SPBASCODE" CODE
60000,2800
```

Robert Newman,
Oundle,
Peterborough.

HACKERS BAD

THE DEFENCE of electronic shoplifters — hackers — in your May Leader was quite touching, implying that all they are interested in is helping big business to tighten up the security of its computer systems.

If an intruder was apprehended in your office in front of your safe, which he had just opened, and he claimed that he was not really interested in the contents at all, but that all he was trying to do was to demonstrate to you that your security was lax, would you really just thank him kindly and send him on his way, perhaps with a reward for the kindness he had done you?

I think the naivety of your leader writer is surpassed only by that of the author of the *Hacker's Handbook* if he really believes what he wrote in the quotation you give from his book on page 49.

I. Howard Wright,
Sauchie,
Clackmannanshire.

SNAKES ALIVE TIP

THANK YOU for publishing my corrections for the game Snakes Alive! last month. I am pleased to say that it is now enterable, and should work straight away.

For those that are still having problems though, a couple of large checksums might help locate the source of your error. These are 417 851 for listing 3 and 377 062 for listing 2. Just write a loop to add up all the contents from 28384 to 32767 inclusive, and these two numbers should be returned for their respective listings.

For those that have successfully typed in all the code, congratulations!!

If you are having problems guiding the snake around all 48 locations, here are a couple of "cheating" Pokes that should (only for a while!) make things easier:

POKE 25803, any number from 1 to 256 (poked as 0). This is the initial SPEED value. Note that it is actually a two byte variable, and large values will be very slow — avoid them! The first byte, at 25802 should only be POKEd with caution — it must always be a multiple of four. Normal value for the second byte is seven.

POKE 25797, any number corresponding to a character from 1-9 (ie 49-57). This is the initial number of LIVES.

These POKEs should be typed after loading in the finalised code.

These should make things easier for those weak souled people who can't stand the challenge. (Or those like me that just aren't fast enough!)

To cater for those who have bought cassettes off me, the same two effects are achieved by holding down keys D and A while the last block of the normal load version loads. You will then be prompted.

D.R. Aspinall,
Brentwood,
Essex.

BITS 'N' BOBS

Line 2510 in June's Amstrad program, Engelbert, is unclear. The last statement should read:

PRINT "#@@!!";

The Spectrum and CBM 64 listings in June's Top Tips managed to get themselves mixed up. And on top of this D. Rockley's listing — for the Spectrum — contains an error in line 50, The USR address should read 64721, not 64271.

Lastly, line 65480, Listing 2 of June's Spectrum program Wizard's Den, reads:

65480: 003C424242423C00 = 384

ARE WE UNDERMINING THE ORGANISATION?

MAY I, as a headmaster of a large comprehensive school whose library accepts your magazine *Your Computer*, complain in the strongest possible way about the June edition.

On page 51, where in the bottom left hand corner you claim no responsibility for what you print, you make two comments which are obviously aimed to undermine the organisation of both schools and examination boards:

(i) "... which might help you break into the computers that store examination records".

(ii) "when you send your idea, ..., for cheating in an exam or pulling off a scam ...".

We feel very strongly at this school that your magazine should not be allowed to be on display in our library if such comments are to be repeated in future editions.

JW Barrett,
The Lindsey School,
Cleethorpes.

SOFTWARE

AT UNBEATABLE PRICES!

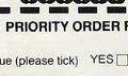
UP TO 50% OFF
MANUFACTURER'S REC. RETAIL PRICES

TRADE AND EXPORT ENQUIRIES WELCOME

A superb selection of the top cassette based titles for all popular makes of computers are offered with up to 50% discount off the manufacturer's recommended retail prices. No messing, full money back guarantee if not highly delighted. If you don't see the title you are looking for, send for our FREE 'descriptive' catalogue of all the titles we have available.

Producer	Item No.	Title	RSP inc. VAT £	Sale Price £
BBC				
Cascade	1	CASSETTE 50	9.95	4.99
Imagine	2	BC BILL	5.50	2.59
Imagine	3	PEDRO	5.50	2.59
Micro Power	4	DANGER UXB	7.95	4.79
Micro Power	5	THE MINE	7.95	4.79
CIC	7	DODGY DEALER	6.50	3.29
Quicksilva	8	BEEB ART	14.95	7.99
Quicksilva	9	MUSIC PROCESSOR	14.95	7.99
Superior	10	COSMIC KID	7.95	3.79
Virgin	11	CHECKOUT	7.95	5.19
Visions	12	DEMOLATOR	6.95	3.29
Visions	13	PENGI	5.95	3.29
A & F	139	COPTER CAPERS	6.90	3.99
A & F	140	HAUNTED ABBEY	6.90	3.99
Acornsoft	141	FACEMAKER	9.95	5.29
Acornsoft	142	HIDE AND SEEK	9.95	5.99
Acornsoft	143	LET'S COUNT	9.95	5.99
Acornsoft	144	NUMBER CHASER	9.95	5.99
Acornsoft	145	NUMBER GULPER	9.95	5.99
Acornsoft	146	NUMBER PUZZLER	9.95	5.99
Acornsoft	147	TABLE ADVENTURE	9.95	5.99
Acornsoft	148	WORDS WORDS WORDS	9.95	5.99
Alligata	149	CHARTBUSTER	9.95	5.29
Alligata	150	DOUBLE ADVENTURE	7.95	4.19
Alligata	151	SON OF BLAGGER	7.95	4.19
Alligata	153	STARSHIP DISCOVERY	7.95	4.19
Alligata	154	TARZAN	7.95	4.19
Alligata	155	UNCLE CLAUDE	7.95	4.19
Bug Byte	156	TWIN KINGDOM VALLEY	9.50	5.19
Level 9	157	COLOSSAL ADVENTURE	9.90	5.29
Level9	159	SNOWBALL	9.90	5.29
Micro Power	161	CYBERTRON MISSION	7.95	4.69
Micro Power	162	GALACTIC COMMANDER	7.95	4.69
Micro Power	163	GHOULS	7.95	4.69
Micro Power	164	INTERGALACTIC TRADER	8.95	4.69
Micro Power	165	KILLER GORILLA	7.95	4.69
Micro Power	166	STOCK CAR	7.95	4.69
Romik	167	ALIEN BREAK IN	6.99	3.29
Romik	168	BIRDS OF PREY	6.99	3.29
Superior	169	HUNCHBACK	7.95	3.99
Superior	170	OVERDRIVE	7.95	3.99
Superior	171	STAR STRIKER	7.95	3.99
Superior	172	WALLABY	7.95	3.99
Visions	173	DARE DEVIL DENNIS	7.95	3.99
Visions	174	SNOOKER	8.95	4.19
Wilcox	175	BLUE THUNDER	6.95	3.29
Superior	278	AIRLIFT	7.95	3.79
Superior	279	JACK & THE BEANSTALK	7.95	3.79
Superior	280	SPACE PILOT	7.95	3.79
BBC & ELECTRON				
Lothlorien	14	THE STOLEN LAMP	6.95	3.29
Lothlorien	281	JOHNNY REB	6.95	4.25
Micro User	346	MAGIC SWORD	8.95	4.99
COMMODORE				
Anirog	15	BONGO	7.95	4.99
Anirog	16	CYBOTRON	7.95	4.99
Anirog	17	PETCH	6.95	3.99
Anirog	18	SPACE PILOT	7.95	4.29
CRL	19	DERBY DAY	7.95	4.29
CRL	20	OMEGA RUN	7.95	4.29
CRL	21	WHIRLYBIRD	7.95	4.29
DKTronics	22	SPEED DUEL	5.95	2.99
Games Machine	23	SKULL	7.95	3.79
Imagine	24	ARCADIA	5.50	2.59
Imagine	25	BC BILL	5.50	2.59
Imagine	26	COSMIC CRUISER	5.50	2.59
Interceptor	27	TROLLIE WALLIE	7.00	3.79
Melbourne House	30	CLASSIC ADVENTURE	6.95	3.99
Micro Power	32	SWOOP	6.95	4.29
Phoenix	33	ATTACK ON WINSCALE	6.99	3.49
Phoenix	34	QUEST FOR GARDEN OF EDEN	6.99	3.49
Phoenix	35	THE SORCERERS APPRENTICE	6.99	3.49
Quicksilva	36	AQUAPLANE	7.95	4.29
Quicksilva	37	BOOGABOO THE FLEA	7.95	4.29
Level9	38	FRED	7.95	4.29
Quicksilva	39	TRAFFIC	7.95	4.29
Taskset	40	GYROPOD	6.90	3.29
Taskset	41	JAMMIN	6.90	3.29
Terminal	42	HUNTER	7.95	3.79
Terminal	43	SUPER SKRAMBLE	7.95	3.79
Terminal	44	TOURNAMENT	7.95	3.79
Thor	45	3D SILICON FISH	5.95	2.99
Virgin	46	AMBUSH	7.95	5.59
Virgin	47	FALCON PATROL	6.95	4.59
A&F	217	CHUCKIE EGG	7.90	4.19
A&F	218	GUM SHOE	7.90	4.19
Alligata	219	CHARTBUSTER	9.95	5.29
Alligata	220	GUARDIAN	7.95	4.29
Alligata	221	SON OF BLAGGER	7.95	4.29
Anirog	222	GALAXY	7.95	4.29
Anirog	224	KONG	7.95	4.19
Artic	225	HUMPTY MEETS FUZZY W	6.95	3.29
Bug Byte	226	STAR TRADER	7.95	4.29
Bug Byte	227	TWIN KINGDOM VALLEY	9.50	4.29
Interceptor	228	HEROES OF KARN	7.00	3.79
Level9	229	LORDS OF TIME	9.90	4.79
Lothlorien	230	JOHNNY REB	6.95	3.29
Micro Power	231	CYBERTRON MISSION	6.95	3.29
Micro Power	232	FELIX IN THE FACTORY	6.95	4.19
Micro Power	233	GHOULS	6.95	4.19
Micro User	234	OLYMPICS	5.95	2.99
Ocean	236	CAVELON	6.90	3.29
Ocean	237	CHINESE JUGGLER	6.90	3.29
Ocean	239	HUNCHBACK	6.90	3.29
Romik	241	DICKY'S DIAMONDS	6.99	3.29
Romik	242	THE GREAT NORDIC WAR	8.99	4.29
Terminal	243	LAZY JONES	7.95	3.99
Terminal	244	PLUMB CRAZY	7.95	3.99
Terminal	245	STAR COMMANDO	7.95	3.99
Thor	246	JACK & THE BEANSTALK	7.95	3.99
Visions	247	1994	6.95	3.29
Visions	248	DARE DEVIL DENNIS	7.95	3.99
Visions	249	SNOOKER	8.95	4.29
Wilcox	250	BLUE THUNDER	6.95	3.29
Anirog	282	CATACOMBS	7.95	3.79
Anirog	283	PC FUZZ	7.95	3.79
Artic	284	ENGINEER HUMPTY	6.95	4.25
Artic	285	HUMPTY IN THE GARDEN	6.95	4.25
Imagine	286	PEDRO	5.50	2.99
Interceptor	287	ASARAUT VTX RAIDER	6.99	3.59
Interceptor	288	BIG BEN	7.00	3.59
Interceptor	289	GUZZLER	7.00	3.59
Superior	290	MAXWIZZ	7.95	3.79
Anirog	303	ZAGA MISSION	7.95	4.95
Anirog	304	ZODIAC	7.95	4.95
Beyond	305	ANKH	8.95	4.95
Beyond	306	AZTEC	8.95	4.95
Beyond	307	MR ROBOT & THE FACTORY	8.95	4.95
Games Machine	308	FABULOUS WANDA	7.95	3.95
Interceptor	309	GUANGO	7.00	3.99
Kenian	310	HURLIMATHS	5.95	3.19
Kenian	311	SPELLICOPTER	5.95	3.19
Ocean	312	STUNT BIKE	6.90	3.79
PSS	313	BATH TIME	7.95	4.95
PSS	314	HYPER BIKE	7.95	4.95
PSS	315	CRYSTALS OF ZONG	7.95	4.95
Palace	316	EVIL DEAD	6.99	3.75
Quicksilva	317	QUANTIC WARRIOR	7.95	4.95
Quicksilva	318	RING OF POWER	9.95	5.29
Quicksilva	319	STING 64	7.95	4.95
Tasket	320	POSTER PASTER	6.90	3.99
VIC 20				
Bug Byte	106	SCRAMBLE	6.95	3.69
Imagine	108	ARCADIA	5.50	2.99
Interceptor	109	CRAZY KONG	6.00	3.19
Interceptor	110	WUNDA WALTER	6.00	3.19
Quicksilva	113	SUBSPACE STRIKER	7.95	4.29
Quicksilva	114	TORNADO	5.95	3.19
Terminal	115	GRIDDER	6.95	3.29
Terminal	117	SKRAMBLE	6.95	3.29
Thor	118	3D SILICON FISH	5.95	2.99
Thor	119	LUV BUG	5.95	2.99
Thor	120	OLLY	6.95	3.29
Virgin	121	CREEPERS	5.95	4.19
DRAGON				
Cascade	50	CASSETTE 50	9.95	4.69
Imagine	51	BC BILL	5.50	2.59
Imagine	52	COSMIC CRUISER	5.50	2.59
Imagine	53	PEDRO	5.50	2.59
CRL	337	ST GEORGE & THE DRAGON	6.95	3.99
CRL	338	KEY OF WRATH	6.95	3.99
Oasis	339	OTHELLO	5.95	3.59
Oasis	340	INVADERS	5.95	3.59
Oasis	341	DOMINOES	5.95	3.59
Oasis	342	DRAGON CHESS	9.95	5.59
Oasis	343	BACKGAMMON	5.95	3.59
CRL	344	ESCAPE FROM MANHATTAN	5.95	2.99
ELECTRON				
Micro Power	54	DRAW	8.95	5.49
Lothlorien	55	JOHNNY REB	6.95	3.49
SHARP				
Sharpsoft	57	BUGS	6.95	3.29
Sharpsoft	58	RAID	6.95	3.29
SPECTRUM				
Anirog	59	KONG	5.95	3.29
Arcade	60	BUBBLE TROUBLE	5.50	3.29
Arcade	61	THE PRIZE	5.50	2.99
Artic	62	MR WONG'S LAUNDRY	6.95	3.29
Bug Byte	63	CYBERN FIGHTER	5.95	3.29
Bug Byte	64	COMP COOK BOOK	9.50	5.19
Cascade	65	CASSETTE 50	9.95	4.69
CDS	66	POOL	5.95	2.99
CDS	67	WINGED WAR LORDS	5.95	2.99
CRL	68	3D DESERT PATROL	4.95	2.99
CRL	69	AHBHH!	5.95	3.39
CRL	70	GLUG GLUG	5.95	3.39
CRL	71	HANDICAP GOLF	5.95	3.39
CRL	72	OLYMPICS	5.95	3.39
CRL	73	PANDEMONIA	5.95	3.39
CRL	74	THE OMEGA RUN	5.95	3.39
Crystal	75	HALLS OF THE THINGS	7.50	3.99
Crystal	76	THE DUNGEON MASTER	7.50	3.99
DKTronics	77	SPEED DUEL	5.95	2.99
DKTronics	78	ZIG ZAG	6.95	3.59
Games Machine	79	SKULL	6.95	3.59
Gargoyle	80	AD ASTRA	5.95	2.89
Imagine	81	ARCADIA	5.50	2.59
Imagine	82	BC BILL	5.50	2.59
Imagine	83	COSMIC CRUISER	5.50	2.59
Imagine	84	JUMPING JACK	5.50	2.59
Imagine	85	PEDRO	5.50	2.59
Lothlorien	86	MICROMOUSE	5.95	2.99
Melbourne House	87	MUGSY	6.95	3.99
Ocean	90	CHINESE JUGGLER	5.90	2.99
Ocean	91	ESKIMO EDDIE	5.90	2.99
Ocean	93	MOON ALERT	5.90	2.99
Phoenix	94	JOKERS WILD	6.99	3.29
Quicksilva	95	ANT ATTACK	6.95	3.79
Quicksilva	96	BOOGABOO THE FLEA	6.95	3.79
Quicksilva	97	DRAGONSEANE	6.95	3.79
Quicksilva	98	FRED	6.95	3.79
Quicksilva	99	LASERZONE	6.95	3.79
Quicksilva	100	SNOWMAN	6.95	3.79
Virgin	101	RACING MANAGER	5.95	4.29
Virgin	102	SORCERY	5.95	4.29
Visions	103	1994	6.95	3.29
Visions	104	SOS	6.95	3.29
A & F	186	CHUCKIE EGG	5.90	3.79
Artic	187	ENGINEER HUMPTY	6.95	3.29
Artic	188	HUMPTY IN THE GARDEN	6.95	3.29
Artic	189	HUMPTY MEETS FUZZY W	6.95	3.29
Artic	190	ON THE OCHE	6.95	3.29
Artic	191	WORLD CUP FOOTBALL	6.95	4.79
Beyond	193	BYTRON	7.95	3.79
Beyond	194	SPELLBOUND	5.95	2.99
Bug Byte	195	ANTICS	6.95	3.79
Bug Byte	197	POOL	5.95	3.79
Bug Byte	198	RAPSCALLION	6.95	3.79
Bug Byte	199	STAR TRADER	6.95	3.79
Bug Byte	200	TWIN KINGDOM VALLEY	7.95	4.19
Digital	201	FIGHTER PILOT	7.95	4.19
Digital	202	NIGHT GUNNER	5.95	3.79
Imagine	205	STONKERS	5.50	2.59
Interceptor	206	FOREST WORLD'S END	5.50	2.99
Interceptor	207	TILER	5.50	2.99
Kenian	208	TURBO CHESS	5.95	2.99
Lothlorien	212	CONFRONTATION	7.95	3.79
Lothlorien	213	CONFRONTATION SCEN	5.95	2.99
Lothlorien	214	SPECIAL OPERATION	5.95	2.99
Micro User	215	OLYMPICS	5.95	2.99
Micromega	216	CODE NAME MAT	6.95	3.29
Alligata	296	SON OF BLAGGER	5.95	3.79
PSS	254	LIES FLICS	6.95	4.99
Silversoft	297	TROUBLE BREWING	5.95	3.99
Thor	298	GIANT S REVENGE	6.95	4.99
ZX81				
Quicksilva	133	QS INVADERS	3.95	2.19
Quicksilva	134	QS SCRAMBLE	3.95	2.19
Romik	135	BANK ROBBER	4.99	2.49
Romik	136	GALAXY JAILBREAK	4.99	2.49
AMSTRAD				
Micro Power	137	GHOULS	6.95	4.19
Terminal	138	STAR COMMANDO	8.95	4.19
Interceptor	271	FOREST AT WORLD S END	6.00	3.29
Alligata	274	BLAGGER	7.95	3.79
Amsoft	275	LAZY MSMASHER	8.95	4.95
Amsoft	276	HUNTER VILLAN	8.95	4.95
ATARI				
Quicksilva	345	MAGIC WINDOW	8.95	4.99

01 446 5648
PHILIPS & PHILIPS CO LTD



PRIORITY ORDER FORM

SOFTWARE
Please rush to me:
FREE 'descriptive' catalogue (please tick) YES ☐
Computer make and model _____
The following titles: (Quote item number)

Item No.	*Unit Price*	*Quantity*	*Total*
		TOTAL	

Postage and Packing FREE with orders over £10.
Orders under £10 – carriage 50p per order.
Please find enclosed full remittance of _____
Please debit my Access/ Barclaycard No. _____
Signature _____
Address _____
Tel No. _____

PHILIPS & PHILIPS CO LTD Scriptomatic House, Torrington Park, Finchley, London N12 9QU

I could do that...

You're a novice programmer and Peeks and Pokes make you nervous. But you've just read John Ransley's First Bytes piece and he has made the whole business seem absurdly simple.

So why not have a crack at this month's competition and Peek and Poke your way to a £15 prize? Write a short, or shortish, program which creates an animated display by Poking to the screen memory.

Spectrum and Amstrad owners will be at a disadvantage here sinnce John Ransley does not talk about bit-mapped displays; the program he gives as an example will only work on micros whose screen memory operates on character codes.

By contrast, the Spectrum's screen memory controls individual pixels not characters. Nonetheless many of the same principles apply but you might need to study your manual first.

Marc Kavanagh, 13 Barber Street, Padfield, via Hyde, Cheshire SK14 7EG, wins May's competition. He neatly illustrates the use of nested loops with a program to print out three, four and five letter word anagrams.

The program can be easily expanded to cope with larger anagrams by altering line 80 and adding more loops. It is written for the Spectrum but will run on most other micros with minor alterations.

```
  10INPUT "ENTER THE ANAGRAM";A$
  20LET L=LEN A$:IF L<3 OR L>5 THEN GOT
O 10
  30FOR A=1 TO L
  40FOR B=1 TO L
  50FOR C=1 TO L
  60FOR D=INT(L/4) TO L AND L>=4
  70FOR E=INT(L/5) TO L AND L>=5
  80 IF A=B OR A=C OR A=D AND L>3 OR A=
E AND L>3 OR B=C OR B=D AND L>3 OR B=E A
ND L>3 OR C=D AND L>3 OR C=E AND L>3 OR
D=E AND L>3 THEN GOTO 120
  90 IF L=3 THEN PRINT A$(A);A$(B);A$(C
);
  100 IF L=4 THEN PRINT A$(A);A$(B);A$(C
);A$(D);
  110 IF L=5 THEN PRINT A$(A);A$(B);A$(C
);A$(D);A$(E);
  120 NEXT E
  130NEXT D
  140NEXT C
  150NEXT B
  160NEXT A
>
```

BEGINNERS *first bytes*

Starting out in home computing? First Bytes is for you. Just write to *Your Computer* with any hardware or software problems, no matter how small or simple.

A bluffers' guide to micros

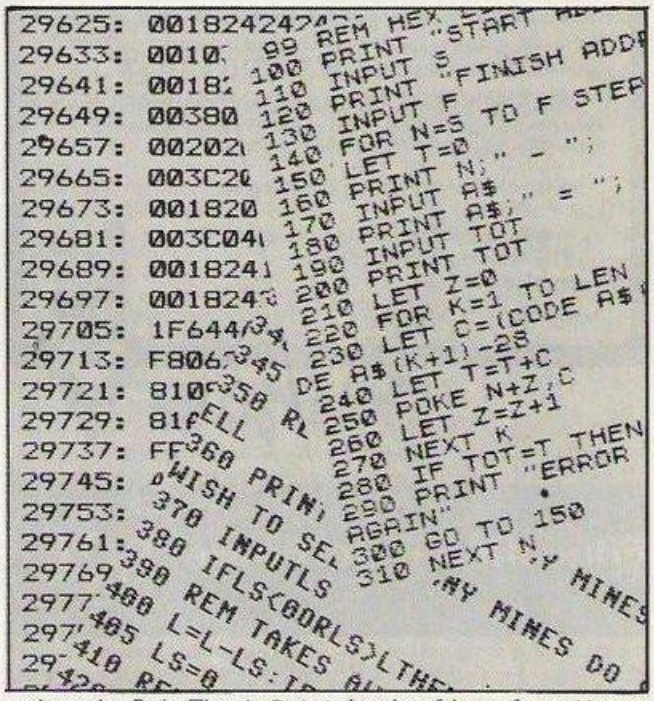
GUARANTEED 100 per cent pure machine code — this sort of crazed statement is made on the backs of obscure cheap-rate software packages which seem to be trying to foist themselves as some sort of silicon potcheen — guaranteed to blow your mind. You don't see it as much as you used to, but nevertheless the term "machine code" has a powerful aura for micro users familiar only with high-level language words like Load or Run.

Those are the sort of words that these wets have to know in order to play their favourite game, i.e. Ghostbusters or Moon Cresta. These people do not have the right stuff as far as real tough he-man programmers are concerned, even if they have a hi-score that looks like Terry Wogan's salary.

A high-level language is one that has human words in it, and it has an interpreter inside it which translates what you type into stuff the computer understands. This takes time, so it slows down programs, which is why machine-code hackers sneer at Basic programs — Basic is a high-level language. To be a real mainline programmer, you've got to speak to the machine in its own language.

You can fudge it by using a compiler — this is a separate program that will translate your whole program into machine code, so you feed the whole translation in instead. But it's like going to Spain on a package tour — you don't really get to know the natives. Anyway, compilers take up a lot of room in a home computer's memory, bashing elbows with the original Basic program and the resulting machine code. Most hard-core hackers take pride in being able to optimise code better than any "dumb compiler."

You can compromise by writing in assembly language using a special program called an assembler, that translates assembly language into machine code. This uses mnemonics which are a bit more comprehensible than machine code but not as easy to understand as Basic. Thus the Basic word Return comes out in Z-80 assembler as RTS and in machine code as 201.



The number system favoured by machine-code programmers is, however, nothing so mundane as good old base 10 numbers like 201. So crazed are they that they make life "simpler" for themselves by using a base 16 notation called hexadecimal This is called "hex" for short, thus making a close linguistic link with the old Pennsylvanian German dialect word meaning to practice witchcraft. The desire for supernatural control of events which all machine-code programmers harbour is thus clearly exposed — hence the use of terms like "machine-code wizards".

The 16 hexadecimal digits are usually represented by 0-9, A-F. So 10 in hexadecimal is A, written as OA for typographical reasons. And 201 becomes C9. Hex maniacs are very plausible. They will explain to those of the uninitiated who can be kept awake long enough that hex is "more convenient". You see, old chap, every single byte number between 0 and 255 can be expressed as two digits.

Hex allows you to see "at a glance" the value of the top four and bottom four bits in each byte. The left digit stands for the top four and the right digit for the bottom four bits. If they are really far gone, they may use the generic term for four bits — a "nibble". Why do they need to see all this? Because the machine-code programmer often has to "set" or "clear" individual bits, ie. fiddle desperately with some relatively unimportant part of the program in a last-ditch attempt to fit it into the computer's memory.

Many would-be programmers are daunted by all this gobbledygook. Some, believe it or not, become disheartened by the prospect of typing in long columns of "meaningless" letters and numbers and spending hours hunting for "bugs", as well as entertaining all their friends for hours on end by explaining the problem.

If this is how you feel, fear not. This is a rational reaction, even though you are interested in computers you need not feel ashamed of it. In closing, let me leave you with this thought: is a bit on the side really a euphemism for extra-marital hex?

Paul Bond.

(continued on page 23)

SPECTRUM+ MAGIC

Tim Hartnell, the world's best-selling author of books on the Sinclair computers, has turned his attention to the Spectrum+ to produce three major works.

SPECTRUM+ LOGO. Just type this program in, and you'll have LOGO graphics running instantly on your Spectrum+ or Spectrum. No need to buy the language. Comes with complete tutorial on LOGO graphics. Book contains full program and tutorial, £2.99 (ISBN 0 907563 65 2).

EXPLORING ARTIFICIAL INTELLIGENCE ON YOUR SPECTRUM+. Study the fascinating world of Artificial Intelligence, as you demonstrate many of its exciting discoveries with the eight programs in this book. The *Computer Bookshelf* section of *The Bookseller* called this work "the best book on AI I have ever seen". £6.95 (ISBN 0 947695 05 2)

ASTOUNDING ARCADE GAMES ON YOUR SPECTRUM+. Four great arcade games in this special 32-page edition of Kwik-Bytes. Just £1.25 (ISBN 0 907563 70 8)

Available from good book and computer shops, or (post free) from:

Interface Publications Ltd., Dept. QTYC,
9/11 Kensington High Street,
London W8 5NP

(UK Trade: WHS Distributors)

Interface

BUSINESS COMPUTERS

Epson PX8 £900 (£872. Commodore PC10 £1595 (£1564) £1664. Commodore PC20 £2573 (£2485) £2685. Sanyo MBC775 £1920 (£1899) £1999. Cannon A200C £1609 (£1586) £1686. Sanyo MBC550 £723 (£689) £799. Sanyo MBC550-2 £975 (£939) £1039.

ORIC AND SINCLAIR COMPUTERS

Oric Atmos computer 48K £99 (£99) £109. MCP40 Oric printer/plotter £109 (£110) £122. Sinclair pocket TV £97 (£95) £101. Sinclair QL Computer £379 (£378) £399. QL Floppy disc interface £107 (£103) £109. Sinclair Spectrum Plus Computer 48K £127 (£129) £149. Kit to upgrade the Spectrum to Spectrum Plus £30 (£30) £40. Microdrive £49 (£507 £60. RS232 interface 1 £49 (£50) £60. Special offer:— Microdrive + Interface 1+4 cartridges £97 (£99) £107. Blank microdrive cartridges £2-£50 (£3) £4. Spectrum floppy disc interface (See Cumana disc section for suitable disc drives) £97 (£88) £99. Interface 2 £20-£45 (£20) £24. 32K memory upgrade kit for 16K Spectrum (issue 2 and 3 only) £31 (£28) £30. Spectrum Centronics printer interface £46 (£42) £47. ZX printer has been replaced by the Alphacom 32 £71 (£69) £82. 5 printer rolls (State whether Sinclair or Alphacom) £13 (£16) £21. ZX81 computer £35 (£35) £45. 16K ram packs for ZX81 £28 (£"" £30.

COMMODORE COMPUTERS

Commodore C16 Starter Pack £119 (£119) £151. Commodore 64 £189 (£194) £226. Convertor to allow most ordinary mono cassette recorders to be used with the Vic 20 and the Commodore 64 £9-78 (£9) £11. Commodore cassette recorder (£43 (£44) £50. Centronics printer interface for Vic20 and the Commodore 64 £45 (£41) £46. Disc drive £197 (£201) £232.

AMSTRAD, ATARI AND ENTERPRISE COMPUTERS

Amstrad Colour Computer £342 (£348) £388. Amstrad Green Computer £232 (£247) £287. Atari 130XE computer £158 (£163) £183. Atari 520ST computer £643 (£616) £656. Atari 800XL computer + recorder £120 (£123) £143. Atari 800XL Computer + disc drive £229 (£230) £260. Atari data recorder £34 (£37) £47. Atari disc drive £172 (£171) £191. Atari 1020 printer £93 (£99) £115. Enterprise 64 computer £234 (£236) £256.

ACORN COMPUTERS

Acorn Electron £119 (£119) £139. BBC Model B, £354 (£343) £383. BBC Model B with disc interface £474 (£461) £491. New BBC Model B Plus £497 (£484) £514. Colour monitor £188 (£228) £268. Kenda double density disk interface system £137 (£131) £141. See below for suitable disc drives.

CUMANA DISC DRIVES

To suit disc interfaces of Sinclair QL, Spectrum, and BBC B. Single:— 40 track single sided £164 (£163) £183. 40 or double sided £169 (£168) £188. 80or ds £219 (£209) £229. Dual:— 40tr ss £294 (£280) £320. 40 tr ds £325 (£325) £365. 80tr ds £414 (£390) £430.

PRINTERS

MCP40 4 Colour printer/plotter £109 (£110) £122. Brother HR5 £162 (£161) £193. Shinwa CTI CPA80:— centronics parallel version £218 (£222) £258. RS232 version £238 (£240) £282. Cannon PW1080A £312 (£308) £358. Epson £249 (£249) £282. Epson RX80/F/T + £283 (281) £316. Epson FX80 £339 (£305) £335. Combined matrix printers and electric typewriters:— Brother EP22 £135 (£124) £144, Brother EP44 £230 (£226) £246.

SWANLEY ELECTRONICS
The computer Export Specialists

Dept. YC, 32 Goldsel Rd., Swanley, Kent BR8 8EZ, England

Tel: SWANLEY (0322) 64851

Official orders welcome. UK prices are shown first and include post and VAT. The second price in brackets is for export customers in Europe and includes insured airmail postage. The third price is for export customers outside Europe (including Australia etc) and includes insured airmail postage.

Educational Software LCL

BBC Micro
Tape, 40/80 track Disc, Econet compatible.

IMMEDIATE DISPATCH

ZX Spectrum
Commodore 64
Electron
unexpanded Vic
ZX81 • Apple • PET
NEC PC8201A
Dragon (book only)
All software for the above computers.

MICRO ENGLISH (BBC, Electron). Complete English Language self-tuition and revision course, to O-Level, of 24 programs. Includes "speak-and-spell" real speech (no extras required). £24.50.
NEW MICRO MATHS 24 program revision or self-tuition course to O-Level. Includes 59 Topics plus two books. £24.50.
SIR FRANCIS DRAKE ADVENTURE GAME. Authentic, historical, graphics adventure game. £6.50.
ANIMATED ARITHMETIC Teaches using movng colour pictures (not words) Ages 3-8. £6.50 (disc £7.50).
BRAINTEASERS Book of IQ tests & puzzle programs. £5.95
". . . excellent" EDUCATIONAL COMPUTING.

*Immediate dispatch Micro Maths, Micro English and Master Maths. Phone or send orders or requests for free catalogue to:

LCL DEPT. Y.

World leaders in educational software (distributors in 24 countries.)

26 Avondale Ave.
Staines, Middx.

Tel: 0784 58771
24 hrs. Orders

Access VISA

TRADE DISCOUNTS
NEW HOTLINE SERVICE

AS SEEN ON TV

BETA BASIC 3.0

SPECTRUM 48K

SINCLAIR USER, JAN. 85 (ABOUT RELEASE 1.8): "HAS ESTABLISHED ITSELF AS THE STANDARD EXTENDED BASIC FOR THE SPECTRUM....TURNS SINCLAIR BASIC FROM A GOOD VERSION OF THE LANGUAGE TO A FANTASTIC ONE." NOW, WITH RELEASE 3.0, BETA BASIC BECOMES PROBABLY THE MOST POWERFUL BASIC AVAILABLE ON ANY 8-BIT MICRO!

- PROCEDURES - a terrific implementation that lets you extend your Basic! No PROC keyword is needed; e.g. you can use commands like: swop a,b or draw_box 10,20,5 or addup bl(),sum. With parameter passing by value or by reference (including arrays), LOCAL variables and recursion.
- Up to 128 WINDOWS with their own attributes and character size.
- ANY CHARACTER SIZE (giving from 1 to 64 or more chars/line!).
- LISTINGS with optional automatic indentation of loops, procedures, IF, etc. Works on existing Spectrum Basic programs too!
- KEYWORDS (including the Spectrum Basic ones) can all be entered by typing them in full, or by the "single entry" method, or both in the same line.
- A full range of TOOLKIT commands. • EXCEPTIONAL ARRAY and STRING handling.
- Many powerful GRAPHICS commands. • EXCELLENT EDITOR - fast an d convenient.
- MICRODRIVE commands are improved and much easier to use.
- OTHER FEATURES, new or improved, are too many to fully list! DO - LOOP structure with WHILE, UNTIL and EXIT IF; ALTER, AUTO, BREAK, CLEAR, CLOCK, CONTROL CODES, DEF KEY, DPOKE, DRAW TO, EDIT, ELSE , FILL, GET, JOIN, KEY?n, multi-LET, LIST a slicer, LIST DATA, ON, ON ERROR, OVER 2, POKE strings, POP, READ LINE, REF, ROLL, SCROLL, SPLIT, TRACE, USING. Faster GOTOs, GOSUBs and FOR-NEXT loops.
- 26 POWERFUL FUNCTIONS: AND, OR, XOR, DEC, HEX$, BIN$; fast SINE, COSE, RND#; CHAR$, NUMBER, DPEEK, EOF, FILLED, INARRAY, INSTRING, ITEM, LENGTH, MEMORY$, MEM, MOD, SCRN$, SHIFT$, STRING$, TIME$, USING$.
- Spectrum Basic compatible - you can run existing programs. Transferable to Microdrive. Wafadrive and other special versions available.
- Comprehensive A5-size manual. More than 80 pages, packed with examples.
- To show you the power of Beta Basic's excellent procedures, we include on each tape a FREE TURTLE GRAPHICS package!
- Upgrades to Release 1.8 customers: If you bought direct from us, there is no need to return your cassette - just quote the (approximate) original purchase date with your order; otherwise return your cassette and name your supplier. The upgrade price of £6.95 (£7.50 overseas) includes a new manual. Release 1.8 remains available, at a reduced price of (£5.95 (£5.50 overseas).
- TRANSFORM your Spectrum with BETA BASIC 3.0 for just £14.95 inclusive! (£15.50 overseas). Or if you want to know more about the program, send us an S.A.E.

(TICK AS APPROPRIATE.) PLEASE SEND ME:
[ ] BETA BASIC 3.0. PAYMENT OF £14.95 (OR £15.50 OVERSEAS) IS ENCLOSED.
[ ] BETA BASIC 3.0 UPGRADE. PAYMENT OF £6.95 (£7.50) IS ENCLOSED.
[ ] BETA BASIC 1.8. PAYMENT OF £8.95 (£8.50) IS ENCLOSED.
[ ] MORE INFORMATION ON _____ I HAVE/DO NOT HAVE RELEASE 1.8 ALREADY.
A STAMPED ADDRESSED ENVELOPE IS ENCLOSED.

BETA SOFT

92 OXFORD RD.
MOSELEY
BIRMINGHAM
B13 9SQ

(continued from page 21)

Scaling new peeks

PEEK AND Poke are — like Burke and Hare or Heffer and Skinner — names guaranteed to strike terror into the hearts of most God fearin' folk and certainly all novice programmers.

After all, when you've only just got the hang of making your screen display look something like the way you meant, after hours of juggling Print and Tab statements and a contagion of semi-colons, it's hardly surprising that you'd rather leave the mysteries of memory addresses alone.

But you'll have to tackle Peek and Poke some day, and there's no better way to start than by experimenting with the chunk of memory that controls your micro's screen display.

First, let's remind ourselves what the statements Peek and Poke really mean. Although every micro has a total memory expressed as 16K — that is, 16,000 bytes — 32K, 64K or whatever, some of that memory is gobbled up by the computer's operating system — including the Basic that makes it easy to write programs — so that in the Commodore 64, for example, just over 39K of Ram is left for your own Basic use.

Check out your micro's manual and you should be able to discover what chunk of Ram is swallowed up by the screen — and, possibly, colour — memory. The 64, for instance, offers a screen display "crossword" of 40 characters across and 25 down — a total of 1000 squares. Each square needs a byte to itself, and so its screen memory occupies the 1000 addresses from 1024 to 2023. Unlike some micros, the 64 needs a separate colour memory for each of those 1000 squares, and this squats at addresses 55296 to 56295. In the Commodore 16 and Plus/4 screen and colour memory run from 3072 to 4071 and 2048 to 3047 respectively. The Spectrum QL screen uses addresses 131072 to 163839, and the Amstrad CPC-464's screen memory occupies 49152 to 65535.

In the demos and program which follow, we'll cut down on finger fatigue by first declaring a variable equal to the first screen/colour memory address. For the Commodore 64, you'd need a line like this:

```
10 SM = 1024:CM = 55296
```

You can think of a block of addresses as a huge rack of cubby holes, such as you might see in a mail sorting office; all have glass doors so that you can see — or Peek — what is inside — but only some of them can be opened so that you may Place — or Poke — something into an empty one, or replace the existing contents with something else.

That "something else" is a different value in the range 0 to 255. In the case of a Poke to screen memory, you'll be using a value chosen from the ASCII — pronounced askey — or machine-specific table of screen codes representing the usual alphanumeric keyboard set as well as the special graphic symbols available on some micros.

Again, there should be a list of these in your manual; but be clear that

ASCII and screen codes are different again from the table of CHR$ values for the same characters. ASCII screen codes commonly run from 0 to 127 — with the alphabet beginning at 1 — with screen codes 128 to 255 usually producing the same character set in reverse field form. Now add these lines:

```
20 FOR L = 0 TO 9
40 POKE SM + L,1
50 NEXT L
```

These lines, as you'll see when you Run them, will serve to Poke the letter A into the first 10 screen memory addresses. They all now hold, of course, the value 1. Prove it:

```
60 PRINT:PRINT
70 FOR L = 0 TO 19
80 PRINT (PEEK(SM + L));
90 NEXT L
```

Run the whole program again, and after the As have appeared, the three new lines will cause the figure 1 to be

BEGINNERS first bytes

printed the same number of times, and then you'll see 10 zeros. That's because the next 10 addresses in screen memory — in common with all the remainder — hold no value at all. Now alter line 40 to:

```
40 POKE SM + L,L
```

for a different result. Finally, enter in direct mode:

```
POKE SM + 5,32
```

and notice how this wipes the character held there, as a direct mode

```
PRINT (PEEK(SM + L))
```

will confirm.

To introduce a little colour into the proceedings, set your prime variables in 10 line as before and then type:

```
20 FOR L = 1 to 10
30 POKE CM + L,L
40 POKE SM + L,L
50 NEXT L
```

Colour codes are usually separately numbered from 0 to 15 or higher, so line 30 simply prints out the first 10 characters in the first 10 colours available. Incidentally, it's better to Poke colour before screen memory, otherwise you'll often get an untidy double image as each character appears; swop lines 30 and 40 to see this effect.

Using Pokes, this next routine produces a quite mesmerising, ever-changing kaleidoscopic display of all the characters and colours your keyboard can generate. It's also ideal for automatically generating sleeve designs for the Eurythmics: Line 20 declares the correct variables for a Commodore 64.

SC should equal your micro's maximum number of character-producing ASCII screen codes, CC the number of colour codes available, SL the total screen locations, and NC the maximum number of characters to a line; alter these variables as necessary to the equivalents on your micro:

```
10 PRINT (CLEAR SCREEN)
20 SM = 1024:CM = 55296:
   SC = 255:CC = 15: SL = 1000:
   NC = 40
30 F1 = INT(RND(1)*SC) + 1
40 F2 = INT(RND(1)*10) + 1
50 F3 = INT(RND(1)*NC*2)) + 1
60 F4 = INT(RND(1)*CC)*1
70 FOR L = 1 TO SL STEP F3
80 POKE CM + F2 + L,F4
90 POKE SM + F2 + L,F1
100 NEXT L
110 GOTO 30
```

You'll find that the best effect is achieved by adding to line 10 your own micro's comands for setting the screen and border colour to white.

John Ransley.

Modems — the whys and wherefores

A MODEM IS one of the most worthwhile add-ons you can have for your computer. And with prices starting now at just a few tens of pounds, it can also be one of the cheapest.

With a modem you can exchange software with friends over the phone, dial up commercial mega-databases such as Prestel or Knowledge Index, or explore the expanding network of privately-run computer bulletin boards.

"Modem" is simply a contraction of modulator-demodulator: it's a two-way converter which translates data in your computer into audible tones suitable for sending along a telephone line — and vice versa.

In the phone line, each bit is represented by a high or low tone, depending on whether it's a 0 or a 1. Since only one bit can be sent at a time, data must be offered to the modem in serial form. So you can't plug in to an ordinary modem unless your computer has a serial port. However, for many popular computers you can get special interfaces or communications packs which take care of the problem.

Among the cheapest modems are the sort known as acoustic couplers. These have rubber cups into which you press your telephone handset when you hear the distant computer answer your call.

Unfortunately, acoustic couplers tend to pick up room noise, which can corrupt the data. So unless portability matters, you may prefer the more reliable direct-connect modem, which plugs into a standard telephone socket. If you haven't got these at home, British Telecom can fit them.

In choosing a modem, decide first which services you're interested in. Several different signalling standards — or tone combinations — are in use; and you can either pick a modem to match or pay more to have a multi-standard modem.

Perhaps the commonest standard now is the viewdata format used by Prestel, which sends data to you at 1200 baud and expects your replies at 75 baud. The figures denote the speed of transmission: in this context, you can take them to mean bits per second.

Each byte you send has to be gift-wrapped with start and stop bits, making up 10 bits or so altogether. So even 75 baud works out a lot faster than you can type!

Some bulletin boards today accept 1200/75 tones, but more usual is the 300/300 baud standard — often referred to in technical jargon as V.21; the viewdata standard is V.23.

To use a modem, you need communications software. Its basic function is to re-route the data paths in your computer: characters from the keyboard must be diverted to the serial port, characters received from the modem must be sent to the screen.

Details of viewdata packages for a wide range of home and business micros are available from Micronet 800, Durrant House, 8 Herbal Hill, London EC1R 5EJ, telephone 01-278 3143.

Richard Lambley.

EXODUS
ULTIMA III

ATARI 64

AN EPIC FANTASY ROLE PLAYING EXPERIENCE
AMERICA'S No. 1 ADVENTURE GAME

★ Up to 20 Character Roster ★ A 1 to 4 Character Party ★ Individual Player Movement ★ 16 Long & Short Range Weapons ★ 8 Armour Types ★ 32 Magic Spells ★ 11 Character Classes, 5 Races ★ New Astrological Influences ★ New Combat Mode ★ New Ship to Ship or Shore Combat ★ New Advanced Dungeon Graphics ★ New Animated Outdoor Graphics ★ New Navigational Strategy ★ Full Colour Visuals Throughout ★ Adventure Style Verb Entry

ORIGIN SYSTEMS INC.

All American ADVENTURES

All American Adventures Limited,
Unit 10, Parkway Industrial Centre,
Heneage Street, Birmingham B7 4LY.
Telephone: 021-359 8881.
Telex: 337268.

£19.95
DISK ONLY

ADD-ON EXTRA

Pacesetters

Joystick interface
Spectrum
£14.95
Nidd Valley Micro

Two joystick interfaces are available, one which uses the Kempston protocol, and, for ten pounds more, a software programmable interface. Both these devices incorporate the company's patented "slomo" slow motion device, which allows you to play game at any speed.

The Connection

Printer interface
Commodore
£79.95
Tymac

Rather on the steep side, this interface plugs into the serial port, and allows the Commodore to be interfaced with any parallel computer. Different versions are available to cope with the graphics commands of various printers. The company claims that the interface is compatible with all software that expects a Commodore printer to be connected. Tel 021 327 6637.

Tape care kit

Global software
Various
£9.95

Two parts to this kit, azimuth alignment and head cleaner/demagnitizer. The azimuth tape constantly monitors the number of errors detected while the tape is running, so alignment occurs when you get fewest errors. Cleaner is of the usual fabric type. A promising start from this new software company. Tel 01-228 6730.

Azimuth head alignment

Interceptor
Amstrad 464
£8.99

Following up their successful alignment tape for the C64, Interceptor are going for the Amstrad. An invaluable device, as so many "faulty" commercial tapes turn out to merely have alignment problems.

HARDWARE hitlist

Dot Matrix Printers

- *Star*
- *£259 upwards*

SAY THE WORD "printer" to the average home computer user, and the chances are he'll think of Epson, for so long the dominant force in the printer market. With this new range of printers, Star hope to make some kind of inroad into this market.

The range consists of three dot matrix printers aimed at the home user; the SG10 at £259, the SD10 at £389 and the SG15 also at £389. They are either Epson or IBM compatible, and offer an attractive near letter quality font and a removable tractor unit. The DIP switches for selecting character sets etc. are easy to get at, usually on the left hand side, a major improvement over Epson's hiding them away inside. In the software, Star have come up with a neat idea, you can define a printer macro, once you define a series of often used commands, you can execute them by just sending the macro command. Perhaps this might have been more useful if several macros could have been defined. The SG and SD10 printers are both eighty columns with speeds of 120 and 160 cps respectively and 2k (just over half a page) buffers as standard, expandable to 6k. The SG15 is 136 columns, at 120 cps and has a 16k buffer as standard. The SD10 uses a ribbon cartridge, the SG's, typewriter style ribbons.

Star printers.

So how do they compare? Well, in use, they seem rugged and reliable. Noise levels were reasonable, the paper feed reliable and precise. The only slight quibbles are that the paper guides are a bit clumsy and the paper tear off is a long way from the print head, which means after doing a form feed after printing your document, you've still got to move the paper by hand before tearing it off. Certainly anyone looking at a printer in this sort of price range should carefully consider this bunch.

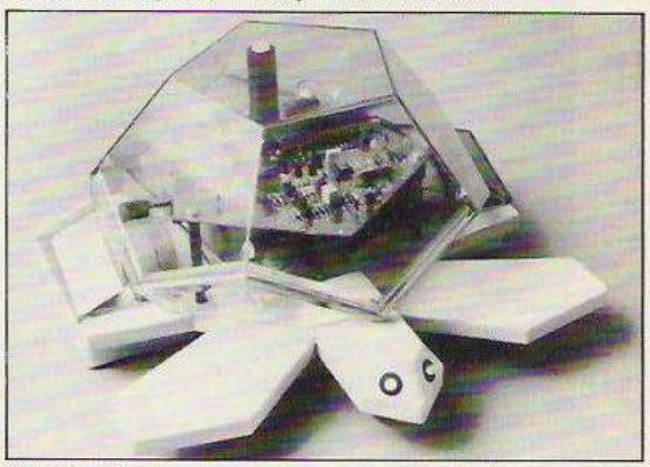
Valiant Turtle

- *Spectrum/BBC/CBM 64*
- *Valiant Designs*
- *£215 for home users, £201 for schools*

THERE ARE at least half a dozen different makes of turtle on the market but Valiant Design's product has already established itself as a rather superior turtle. Primarily intended for use in schools, it has two features that make it especially attractive to children. First it looks more turtle-like than most of its competitors. As well as legs, a shell, and a head, it even has a pair of red LEDs for eyes.

Second, it is not hampered by wires and cables but can roam free under the remote control of an infra-red transmitter. This device connects to your micro by either a serial or parallel lead, and gives the turtle a range of up to six metres. Power is provided by nickel cadmium batteries.

On top of this the turtle appears to be both robust and accurate; sufficiently accurate in fact to double up as a simple plotter. Its main use, however, will be to create turtle graphics in conjunction with Logo. Although the turtle pack does not include Logo it supports most versions of the language currently available. For more details ring Valiant Designs Ltd, 01 720 3947/627 1351.



Valiant turtle.

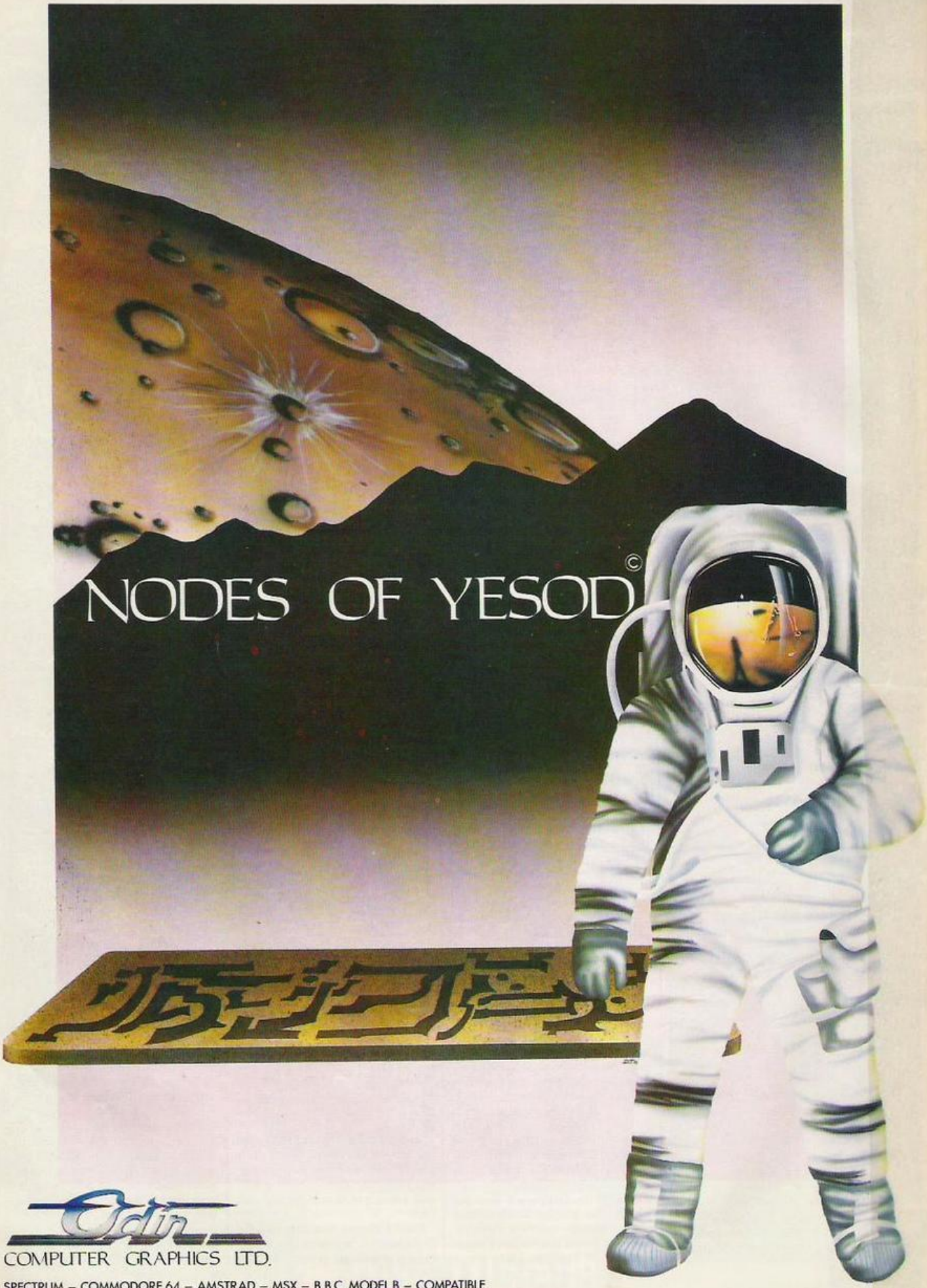
Interface III

- *Spectrum*
- *Evesham Micro*
- *£39.95*

IT HAD TO come, the ultimate copier against which there seems little possibility of protection. But of course, you would only use it for copying your own software to Microdrive wouldn't you?

Hardly elegant, this unit uses the sledgehammer approach to cracking the nut of software protection. After you have loaded in the game, you simply hit a button on the unit, which plugs into the back of the Spectrum, and it simply dumps the entire contents of Ram out the cassette port.

It also gives you the option of loading the screen display (important if machine code has been hidden in the screen area). Skipping this will mean that the program will take up about 5 sectors, so you can get two games onto one cartridge. The obvious disadvantage is that no matter how short the program is it will take up about the same amount of space.



SPECTRUM – COMMODORE 64 – AMSTRAD – MSX – B.B.C. MODEL B – COMPATIBLE
TELEX 628332 GAME G TELEPHONE SALES 051-709 4462
© "NODES OF YESOD" IS A COPYRIGHT OF ODIN COMPUTER GRAPHICS LTD

Star chart

On-Court Tennis

CBM-64
Activision
Tennis simulation
£10.99

★ ★ ★

Good quality simulation — as with the quarter backs in this company's football game, the tennis players have individual personalities, so Ivan Messier has a great serve and plenty of endurance, but Jimmy Orr sometimes wears a bit thin.

Didn't actually throw his racket at anyone while I was playing. You can select surfaces to play on.

On-Field Football

CBM-64
Activision
US football simulation
£10.99

★ ★ ★

At first glance this looks like a game of table football — same overhead view. But this game has all the jargon and complexity of the real thing, without the popcorn and the cheer-leaders. You choose your starting quarterback, wide receiver, and tight end to fine tune your offensive strategy. You can even bring in substitutes. If you don't understand what all this means, then buy this game and catch up with Nicky Horne.

Quackshot

Spectrum
Creative Sparks
Arcade adventure
£2.95

★ ★ ★

No prizes for innovation, but value for money at the Sparklers economy price. A Tutankhamunesque maze game in which you, nightwatchman in the Acme Clockwork Toy Factory, are confronted by rampaging clockwork ducks. Armed with duckbuster bombs and stun gun you must fight them and the green snakes off. As with Tutankhamun you have to collect keys to move between levels.

SOFTWARE Shortlist

The Artist

- *Spectrum*
- *Softek*
- *Graphics utility*
- *£12.95*

★ ★ ★ ★ ★

SELL YOUR Macintosh. That's what ex-Volvo assembly line worker turned full-time programmer Bo Langeborg suggests people will be able to do once they've loaded his new program into a Spectrum.

There are even plans afoot to market this program with a mouse for the Spectrum. But at the moment you have to get by with five fingers to move the cursor. When the program has loaded you are confronted with an empty screen and two flashing cursors, one square, one cross-shaped.

You can get straight into some sort of Mac type painting by selecting a paint-brush and a brush pattern. At the base of the screen you have a choice of eight special commands — apart from brush and brush pattern these include a text option, a view command which shows you the whole screen without the commands, a move option which enables you to raise the screen so you can work on the base of the picture but still see the commands, a clear-screen option, a storage and a character creation option.

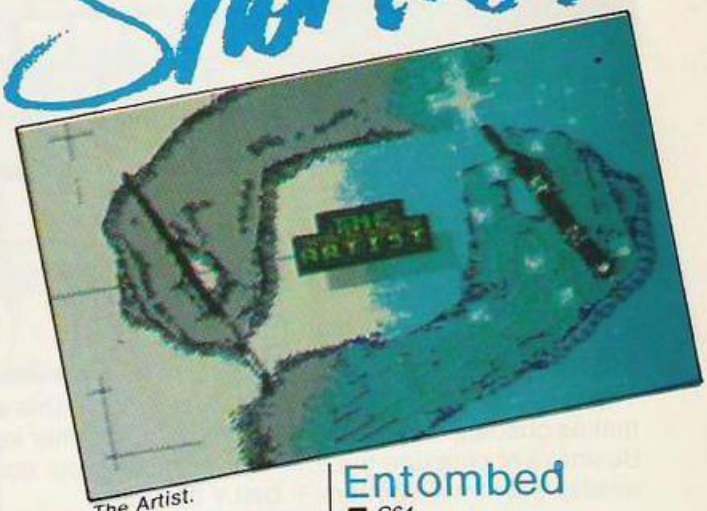
The reason you need five fingers is that apart from the directional controls of the brush you need to keep your thumb on the C key which sets the pixels on the screen.

By pressing the symbol shift key you can move between two sets of other commands, pixel setting commands and colour setting commands. The pixel command section has some very powerful commands. You can enlarge sections of the screen. You have instantaneous box and circle commands.

This section also has an overlay command which is comparable to placing a plastic sheet on top of a picture and copying it.

The colour commands open up a window around the cursor and the cross. Inside it ink, paper brightness and flash can be set separately.

Paul Bond



The Artist.

Entombed.

Elidon

- *CBM-64*
- *Orpheus*
- *Arcade adventure*
- *£7.99*

★ ★ ★ ★

PLENTY OF whimsy in the software market this month. We are treated to a trip to fairyland in Elidon. The beautiful graphics depict a hapless flower fairy as she tries to collect seven bottles of magic potion followed by pouring the bottles on to magic flowers in order to revive the magic garland to its former glory.

On her way she is hindered by tree-spirits, flames, strange bundles of energy and eerie darkened rooms peopled by things with glowing eyes. A fir cone, a leaf, a crabapple — any of these will help her ward off the unwelcome attentions of the evil spirits. There are also lucky horse shoes to be found for bonus points. But do not pick up the ones which are upside down, for of course all the luck will have drained out of them and they will kill you.

It's possible to pick up a torch to guide the fairy through the darkened rooms and she needs all the help she can get for her V/STOL capability is easily upset by the slightest bump. It is possible to get her to hover by judicious use of the fire button.

There are also forcefields which can only be penetrated by the aid of a horn or a set of pan pipes.

And in this exciting Ultimatesque game, your little fairy is going to need all the angel dust she can get.

Paul Bond

Elidon.

Entombed

- *C64*
- *Ultimate*
- *Arcade*
- *£7.95*

★ ★

THERE IS ALWAYS a buzz of expectation whenever a new Ultimate title comes along. With a string of hits like Knightlore, Underwurlde and Alien 8 under their belt, we've come to expect something rather special from them. Entombed is set in Egypt, where our intrepid explorer, Sir Arthur Pendragon, is entombed beneath the Sphinx, searching for the scrolls which will help him get out of this tricky spot.

The screen display shows a Scarab on the wall's view of Sir Arthur wandering about the corridors. There are two varieties of screens, scrolling, maze-like corridors and rooms where the various objects of your quest lie. The walls of the corridors are nicely done, covered in hieroglyphics. Apart from the scrolls, there are two objects you collect of more immediate value, a whip and a torch.

The problem is, the whole thing is rather sterile and predictable. In the corridors, you are constantly being irritated by things materialising and attacking you as you try to map out the maze. The rooms are too small to pose an interesting challenge like Manic Miner and clones, and the solution is normally irritatingly trivial. Nothing constructive in the way of hidden clues is done with the hieroglyphics, the nasties in the corridor are just plain irritating and time consuming.

A pity, but not really up to the high standards we have come to expect. This game was actually written by a bunch called ACS and marketed under the Ultimate lable, they would do better to stick to the Spectrum and their in-house programmers.

Lee Paddon.

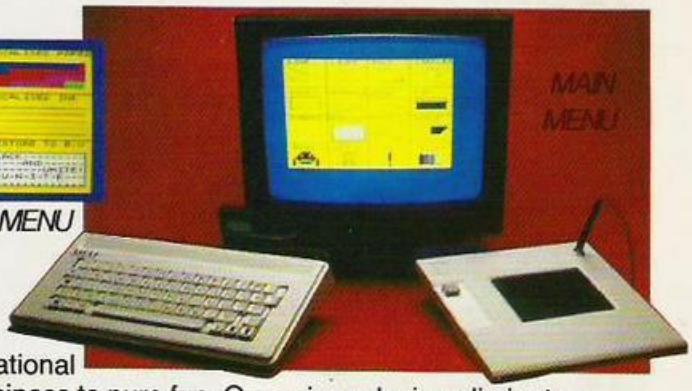
(continued on page 29)

The SAGA 1 EMPEROR has 67 keys which enable easy access to every function. The SAGA 1 EMPEROR makes obsolete the "stretch requirement" of other keyboards and enhances the ability to touch type. For Business or pleasure the Emperor will make your computing time more productive and enjoyable. Now available for the Spectrum + **ONLY £49.95**

FOR GREAT GRAPHICS . . .

UTILITY MENU

COLOUR MENU



YOU'VE GOT TO HAVE STYLE!

Whether you are 5 or 95, using joystick or GP, full colour STYLE puts you in direct command of your graphics. Already in use in software houses and educational establishments, uses range from screen design to Business to pure fun. Our unique design eliminates endless reading of manuals. STYLE displays all options on screen, enabling you to start designing and flip from menu to menu fast, with some very useful built in routines. STYLE offers exceptional value for money, containing both Software and full Kempston compatible hardware for GP or Joystick operation.

STYLE £29.95 SAGA GP £79.95 (Graphics tablet for Style)

SOUNDBOOST	FLEXICABLE	DUSTCOVER	PERSONAL CARRIER
Connect and go system puts adjustable sound through your TV Speaker **ONLY £9.95**	Now with two connector ports, exceptional value, a must for add-ons **ONLY £12.95**	Keep your equipment clean and smart, our popular dustcover does this and more **ONLY £4.95**	Or how to store your equipment, our PC! is capable of holding computer, peripherals, magazines and software, and makes everything neat and portable. **A MUST at ONLY £26.95**

SSL

Available across the UK and from retailers in the following countries:
AUSTRALIA – BELGIUM – DENMARK – FINLAND – FRANCE – HOLLAND – GERMANY – ITALY – SPAIN – SOUTH AFRICA – SWEDEN – SWITZERLAND – NEW ZEALAND

Please send me the following products:

- ☐ *SAGA 1 EMPEROR at £49.95 (48K or +?)
- ☐ *SAGA GP at £79.95
- ☐ STYLE at £29.95 (inc P&P)
- ☐ DUSTCOVER at £4.95 (inc P&P)
- ☐ SOUNDBOOST at £9.95 (inc P&P)
- ☐ FLEXICABLE at £12.95 (inc P&P)
- ☐ *PERSONAL CARRIER at £26.95

*Please add £1.50 UK or £4.50 overseas Post and Packing
DEPT SAGA SYSTEMS LIMITED, 2 EVE ROAD, WOKING, SURREY GU21 4JT

Name ADDRESS

AMOUNT ENCLOSED £

My Credit Card No. is ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

SIGNATURE DATE

Delivery promised within 28 Days

Star chart

Flip!

BBC
Strategy word game
Icon
£7.95

★ ★ ★

J S Bach meets Ghostbusters; Mozart clashes with Teddy-bears' Picnic. In Icon's Pelmanism-cum-word game, classical compositions mix with modern classics and classy graphics.

To score points you have to flip over the boxes to reveal matching pairs of graphics — Pac-Man, a Space Invader and a teddy-bear to name but three of the 15-odd characters on the 4-by-10 grid.

As each box flips over you see the animated graphic and hear a snatch of its theme tune; find its partner and you hear the rest of the musical phrase. Behind the correctly paired boxes are fragments of letters which go together to spell a word. That's the second part of the game.

It's a race to identify the hidden word. But in the two-player game rash guesses made too early only give points to your opponent.

Ghettoblaster

CBM-64
Virgin
Arcade adventure
£8.95

★ ★ ★

Rockin' Rodney — no relation to Rankin' Rodney in Taskset's Jammin' — has to shop for batteries and search for a tape to put in his FBR (frightfully big radio).

Then press F5 and you will hear the beat. The aim of the game is to successfully deliver 10 tapes to Interdisc Records. Meantime he can press the firebutton and fire notes at people to make them liven up.

A good game with some humour — street names like Electric Avenue get in, as do hippy anomalies like the Doors' Moonlight Drive and Love Street. Bob Dylan gets most streets into this game.

(continued from page 27)

Charlie and the Chocolate Factory

- *Spectrum*
- *Hill MacGibbon*
- *Arcade adventure*
- *£9.95*

★ ★ ★

JUST IMAGINE that! A whole day inside an enormous chocolate factory! And not just any old enormous chocolate factory! No, it's Wonka's Factory, where they make marshmallows that taste of violets, and chewing gum that never loses its flavour.

This is the prize that Charlie Bucket wins when he finds a golden ticket in a Wonka's chocolate bar. And this is the plot of Roald Dahl's scrumptious book, *Charlie and the Chocolate Factory*. Now those lovely people at Hill MacGibbon have turned it into a yummy computer game.

The primary game is split into four sections based on the plight of individuals who fall foul of the Chocolate Factory in the best moralistic way. Augustus Gloop whose face is like a monstrous ball of dough with two tiny currant eyes peeping out, becomes a purple blob in one of the sweet machines. Depicted in a maze of pipelines on the Spectrum screen, you must move Charlie backwards and forwards at the base of the screen, twisting pipes until Augustus is safely decanted into a flask. Otherwise he emerges from an open pipe as a sticky cloud.

The next section has Violet Beauregarde menaced by bouncing blueberries. Basically a breakout-style format you use keys 6, 7, 8 and 9 to move Violet around and get her shield to fend off the ferocious fruit. The idea is to bounce berries into a juicer, or else.

The fourth section confronts television addict Mike Teavee with TV cameras. Their deadly rays can only be counteracted by eating Wonka bars.

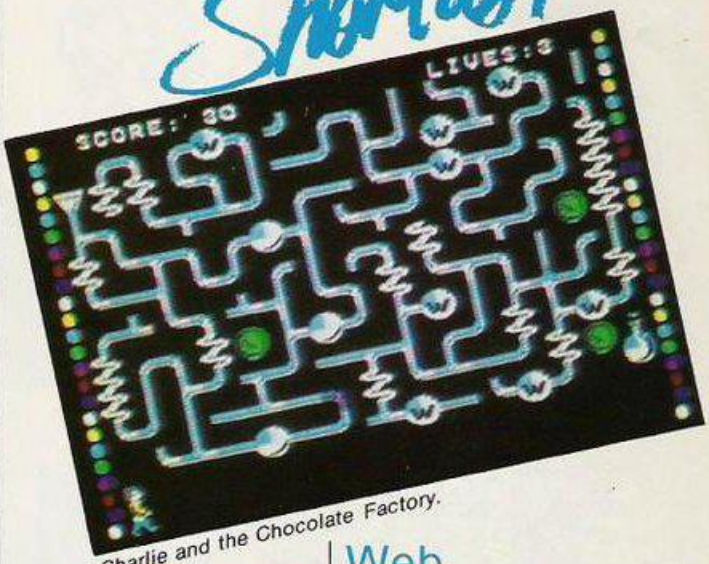
In the third section Veruca Salt has enraged the squirrels in the nut room. They want to chuck her out with all the other rubbish. She tries to leave poison nuts in their path, but these fade away quickly.

A nice touch is that you can practice each section without having to play the whole game, but if you rescue Charlie's companions in the primary game, then you will be given the code you need to help Charlie find the six gold keys in the chocolate factory.

And this leads you to a whole new game on the flip-side of the cassette. This would seem to be a game in the style of Manic Miner, with 43 challenging rooms to explore, in order that Charlie can enter the Great Glass Lift.

Paul Bond.

SOFTWARE Shortlist



Charlie and the Chocolate Factory.

Jonah Barrington's Squash.

Jonah Barrington's Squash

- *Spectrum*
- *Simulation*
- *New Generation Software*
- *£7.95*

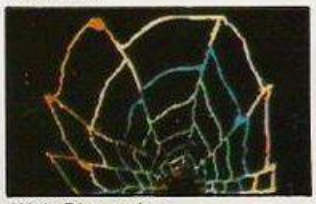
★ ★ ★

JONAH BARRINGTON'S (he is a famous squash player) Squash can be played against another human, or against the computer.

There are four difficulty levels, just as there are four ball spot colours in squash, ranging from red (easy) to yellow (difficult). The screen display is split in two sections with a three-dimensional representation of the game on the left hand side of the screen.

Hitting the fire button makes your player do a forehand or a backhand stroke, depending on the position of the ball when the button is pressed. So by careful timing you can alter the angle at which the ball leaves the racquet.

Paul Bond



Web Dimension.

Web Dimension

- *Commodore 64*
- *Ecological game*
- *£10.99*

★ ★ ★

THE SCREEN DISPLAY shows a complex section of a web. Life-forms drift aimlessly about the web. Pressing the fire button you must move your sprite — a musical note — along the webways, being careful not to touch the glowing ones.

Using the music you can freeze the life-forms at the nodes of the web. Once they are all frozen, the second stage starts.

In this stage you must stabilise the creatures, which are in the form of coruscating stars at the transitional phase. Then you see the next stage of evolution.

Paul Bond.

A View To A Kill

- *CBM-64*
- *Arcade adventure*
- *Domark*
- *£10.99*

★ ★ ★

THE GAME attempts to faithfully replicate three major action sequences from the movie.

The top half of the screen gives you a thee-dimensional view a la Monster Maze of the streets. The lower half is an over head map view of Paris. A tracking bleeper indicate proximity of target.

Next, Bond's girlfriend who has the unlikely name of Stacy is trapped in a lift. Zorin has torched the building.

Essentially a platform game, the programmers have included a rather ingenious lookdown facility in the third stage.

Paul Bond

(continued on page 31)

ULTIMATE
PLAY THE GAME

48K SINCLAIR SPECTRUM
AMSTRAD
BBC MODEL B

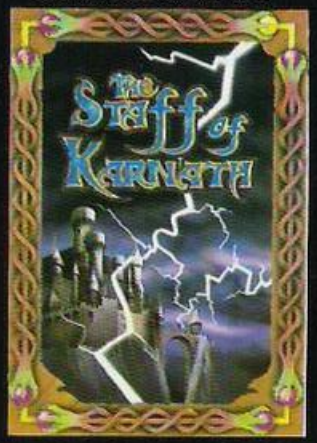
48K SINCLAIR SPECTRUM
BBC MODEL B

48K SINCLAIR SPECTRUM
BBC MODEL B

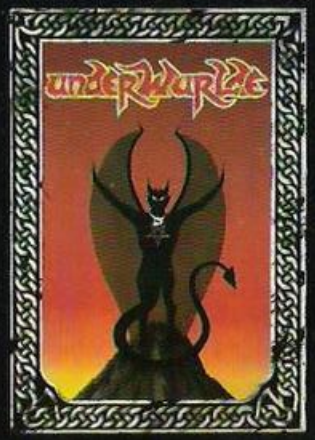
48K SINCLAIR SPECTRUM
AMSTRAD
BBC MODEL B

COMMODORE 64

COMMODORE 64



48K SINCLAIR SPECTRUM



AMSTRAD CPC 464

"ALIEN 8", "KNIGHTLORE", "UNDERWURLDE", "SABRE WULF", "ENTOMBED", & "STAFF OF KARNATH" recommended retail price £9.95 inc VAT. "ATIC ATAC" recommended retail price £7.95 inc VAT. Available from W.H.SMITHS, BOOTS, J.MENZIES, WOOLWORTHS and all good software retail outlets. Also available from ULTIMATE PLAY THE GAME, The Green, Ashby-de-la-Zouch, Leicestershire LE6 5JU (P&P are included) Tel: 0530 411485

Star chart

Beeline

BBC
Robico
£5.50
Maze game

★ ★ ★

Hank is a blue bee who explodes when he gets angry or tired. Your mission is to guide him to his beehive. Watch out for energy-sapping toadstools, spiders, faces, insecticide cans and the lizard's tongue.

Meanwhile, collect pollen grains, flowers, apples, honey pots and bowls of water.

Bulge

Spectrum/CBM-64
Lothlorien/ASP
£9.99
Wargame

★ ★

After the bouquets last month for Arnhem from CCS, it's time for the brickbats. To say that this is an improvement on Lothlorien's previous effort, Panzer Attack, would be true but would be no recommendation. It is in real time, and as the German commander, you simply haven't got time to issue all the orders you need to. As the game progresses and units get spread far and wide, you spend most of your time chasing round the map after errant units. Any bulge game which doesn't feature roads is doomed to failure.

Wetzone

BBC
Everiss Software
£6.95
Shoot 'em-up

★

An engaging little whimsy from the house set up by Imagine renegade Bruce Everiss. Lots of different things to shoot at and every so often a UFO whizzes across the screen. If you hit it you score extra points. Sounds familiar? It did to us. We conclude that Bruce is re-examining his roots rather like Eric Clapton returning to the blues, or Working Week re-assessing jazz.

SOFTWARE Shortlist

(continued from page 29)

Contraption

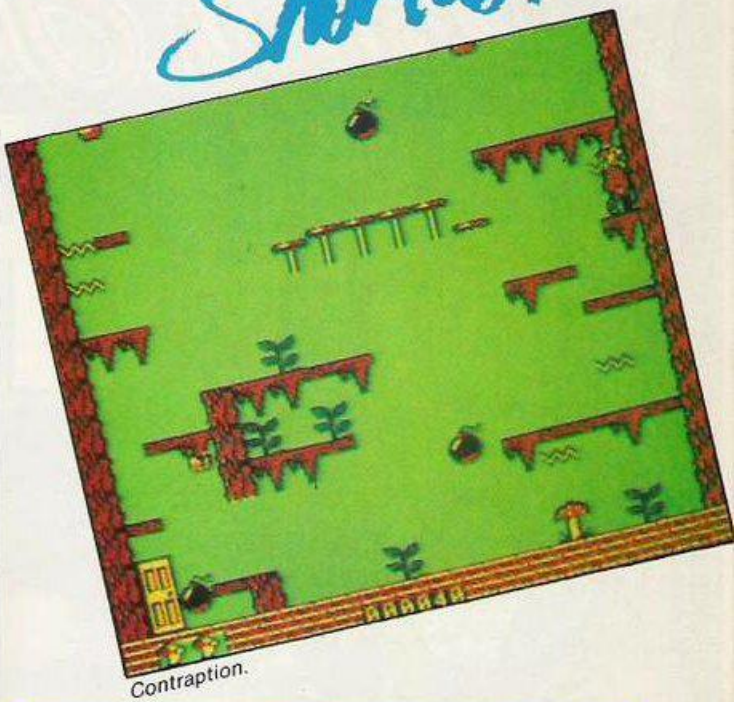
- *BBC*
- *Platform*
- *Icon Software*
- *£8.95*

★ ★ ★ ★

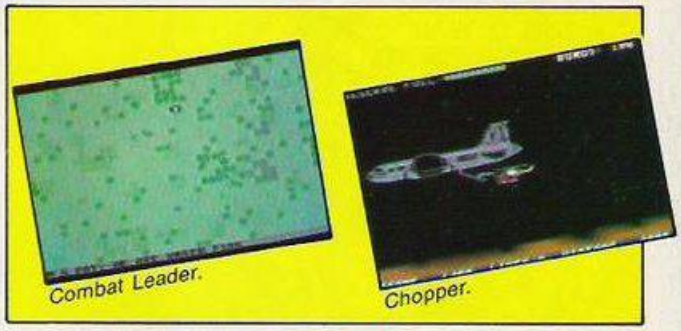
GAMES programmers — or designers as they now like to be called — sometimes complain that reviewers do not play their games long enough to do them justice. Helen and David Mann, the authors of Icon's Contraption, need have no such fears: between them *Your Computer*'s games reviewers have racked up hours of playing time on this one. The game has inspired seasoned reviewers — veterans of scores of platform campaigns — to rise from their desks clamouring to be let at the keyboard.

As far as the plot is concerned the game is fairly conventional. You have to jump, bounce and scramble your way through 10 screens, picking up apples and avoiding such perils as floating bombs and toxic plants. But the course in each screen is particularly well constructed, and pitched at just about the right level of difficulty. At first sight it seems that you will never reach that vital ledge, or catch a lift from that floating coffee table. But once completed each screen is plain sailing the next time round.

However what really marks this platform game out as special is the superb use it makes of Mode 1 graphics. Adopting the Frak technique of outlining figures in black allows the designers to show all sorts of pleasingly inventive details which make most Mode 2 games look distinctly crude in comparison. Pipes actually look three-dimensional, bouncing valves gleam, and your little man is a real character study — a benign balding old timer clad in red Mao jacket which admirably sets off his tuft of ginger hair.
Simon Beesley.



Contraption.



Combat Leader. Chopper.

Combat Leader

- *CBM-64*
- *Wargame*
- *U.S. Gold*
- *£9.95/£14.95*

★ ★ ★

COMPUTER wargames are big news in the states, and SSI are the big name. This offering from them, via US Gold, puts you in command of a company of mixed tanks and infantry, against a similar force commanded by the computer. There are seven different scenarios available, giving you a range of objectives, or you can choose a roll-your-own option where you can pick the forces you and the computer will control and the objectives. This option also allows you to specify the characteristics the vehicles will have, and to help you, some historical data is provided to allow you to pit Shermans against Tigers, or even, if you have a taste for the bizarre, Matildas against Sheridans.

There are eight different mixes of terrain, most thickly wooded, with the odd hill. A river with a bridge might have been nice, but you can't have everything.

The game plays quite smoothly. You issue orders to units by a combination of keyboard and joystick. The unit's response is then displayed. Units report their position, and that of any enemy units they see.

The game seems rather weighted against the poor bloody infantry, whom you would expect to do pretty well in this sort of terrain. Despite being equipped with anti-tank weapons, they tend to come off second best.

Tactics are minimal, advance under cover until you find the enemy, then fire like mad until one of you is dead. However, interest is maintained by the wide variety of missions you can try and you can have different mixes of forces, and different types.

Certainly a lot less trouble than setting up a miniatures game.

A good first attempt in a difficult field where everybody has their own theory about what constitutes "realism" and historical accuracy.
Lee Paddon.

Chopper

- *Creative Sparks*
- *CBM-64*
- *Scramble-type*
- *£2.50*

★ ★ ★

WORTH every penny of £2.50 this is another example of the Sparklers philosophy: "if you can't beat 'em, undercut 'em".

Instead of a spacecraft you fly a helicopter against oncoming hordes of hostile rotorcraft. The angry buzzing of a massed helicopter squadron is faithfully replicated by the 64 and is guaranteed to make the neighbours think you are shooting the sequel to *Apocalypse Now* in your living room. The drawback is that you are fixed to the right hand side of the screen and can only move up and down. You can't shoot when you're moving and vice versa.

On the second screen, which you achieve after a tricky refuelling sequence in which you have to rendez-

(continued on page 33)

Now after the glory of gold enter

Daley Thompson's SUPER-TEST

PISTOL SHOOTING

SPRING BOARD DIVING

TUG O' WAR

GIANT SLALOM

CYCLING

ROWING

PENALTIES

SKI JUMP

SPECTRUM 48k	COMMODORE 64	AMSTRAD
6-95	7-95	8-95

Ocean Software is available from selected branches of:
WOOLWORTH, WHSMITH, Boots, John Menzies, LASKYS, Rumbelows, COMET,
Spectrum Shops and all good software dealers.

ocean

Ocean Software
Ocean House · 6 Central Street
Manchester · M2 5NS
Telephone 061 832 6633 · Telex 669977 Oceans G

Star chart

Baseball

C64
Activision
Sport
£10.99

★ ★

A poor copy of the Imagine Baseball game reviewed a couple of months ago. You get to field and bat, when fielding you choose the ball you pitch and manipulate the fielders. As batsman, you choose when, and if, to swipe the ball. Only one view is given, from the perspective of the spectator, with none of the nice touches which made the Imagine version bareable, mind you, at least we are spared the ra-ra girlas at half-time.

Chicane

BBC
Kempston
£7.95
Racing game

★ ★

With absolutely phenomenal timing, Kempston launch a racing game hot on the heels of Acornsoft's "Revs". Unfortunately, this game is rather left in the pits with a dead engine compared to Revs. As a game, it is quite good, but a simulation it isn't. Steering, throttle, break and gear changes are all included. There are six different circuits to race round.

Theatre Europe

PSS
C64
£9.95
Wargame

★ ★ ★

Following on from their Midway game, this is set in the near future, when the treacherous Russians come charging over the North German Plain, bent on bringing the peace-loving west under their ruthless iron heel.

Behind this distasteful scenario is an even more distasteful game. Technically very well executed, the conventional battle is a dull slugging match.

(continued from page 31)

vous with a stratotanker, you are plunged headlong into the usual surreal mixture of balloons, ducks and what-have-you so beloved of the true sprite graphic craftsman. The ducks fly past in strict formation — the more ducks pass, the more points you get. But you will probably bend your rotors on an airship first.

If you survive to screen three, you will discover the purpose of your mission, which is to chuck bombs down horizontal airshafts to destroy the enemy base in the time-honoured way. The enemy whirlybirds contrive to get in your way and are practically invulnerable on this screen. If you like clenching your teeth and screaming, then this is the game for you.

Paul Bond.

Taskmaster

- *CBM-64*
- *Shoot-'em-adventure*
- *Creative Sparks*
- *£2.50*

★ ★ ★

WITH excellent three-dimensional graphics and seven screens, this looks like the sort of game that US Gold was marketing for £14.95 a year ago. Maybe the programmers could have done a little more with the sound facility, but for £2.50 this example of the new Sparklers range from Creative Sparks is good value.

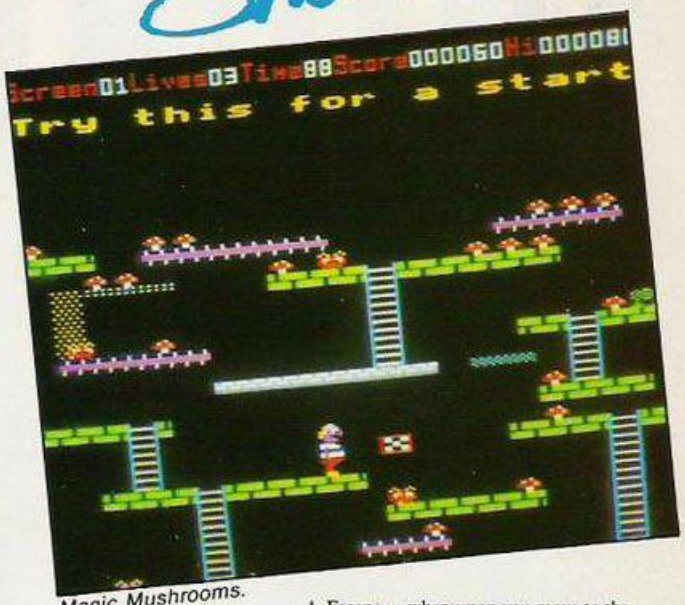
As the sun goes down on the first screen, the valley in front of the castle darkens and the zombies troop on like football supporters aimlessly wandering about and treading on you if you get in their way. Your man is armed with darts and you must keep blasting if you hope to see the second screen. This is the wizard of Dabbit Wood who appears at random and launches heat-seeking spells at you. Getting through this screen is more a matter of luck than good judgement — then you find yourself outside a cave in Vampire Mountain. You have to pick up four sacred statues and since your man is getting a big tired now he seems to walk more slowly and weave about. This is not good because bloodsucking bats issue forth from the mouth of the cave.

On the next screen our man is evidently getting into ancient history, as we find him by a stone circle. But the guardians of this creepy cromlech are the Devil Worshippers of the Temple of Demons — a bunch of trigger-happy mad monks. Undeterred — our hero winds up in the cemetery being assailed by ghouls. By this time I was so shellshocked I forgot to notice what the screens were actually called.

Paul Bond.

Taskmaster.

SOFTWARE Shortlist



Magic Mushrooms.

Magic Mushrooms

- *BBC*
- *Platform game*
- *Acornsoft*
- *£12.95*

★ ★ ★

IF YOUR HEART sinks and a drowsy numbness steals over you at the mention of platform games Magic Mushrooms might be the antidote. It is a game in two parts, both a standard issue nine screen platformer and DIY platform construction kit. The halucinatory fungi in question are what you have to pick up along the way.

The ready-made screens are frustratingly difficult if not impossible; but at the point at which you are about to give up in despair you can press Escape — whereupon you move to the Edit screen. Along the top there is a menu of 15 items, among them escalators, monsters, crumbling and firm platforms, trampolines, and slides — all the items, in fact, that you would expect to find in a well stocked platform game.

It is now a simple matter to take out a troublesome monster or add a new stairway. Alternatively, you can give your imagination free rein by scrubbing one of the ready-made screens and building a new one. Either way, you can then save your creation.

If you are the one setting the traps and obstacles they probably will not present you with much of a challenge, although they may to others. But the real interest lies simply in designing new screens, an activity which turns out to be even more compelling than playing the game itself.

Peter Connor.

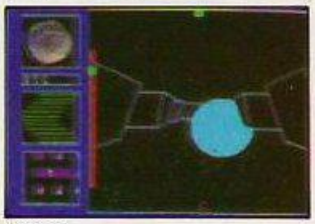
Gyron

- *Spectrum 48K*
- *Firebird*
- *Maze*
- *£9.95*

★ ★ ★ ★

AT FIRST YOU might look on this game as a maze game crossed with a shoot-'em-up, with some nice graphics. But this would be to dismiss a game which gradually grows on you. It is more reminiscent of Rubik's Cube than a run of the mill maze game.

The first thing that strikes you is the graphics. You pilot a ball, or Hedron, around a maze. The maze scrolls smoothly past you as you move down the three dimensional trenches. Control is achieved with cursor keys or joystick. Moving the joystick to one side or the other will move the Hedron across the trench, and, if opposite the opening of a side trench, the Gyron will turn the corner.



Gyron.

There are a number of spheres rolling around the place according to predetermined patterns. These, needless to say are deadly. Then there are the towers, these are a different kettle of fish all together. These are orientated in a particular direction, which you get from a small radar map of the neighbourhood. If you roll in front of these, you get shot.

Lee Paddon.

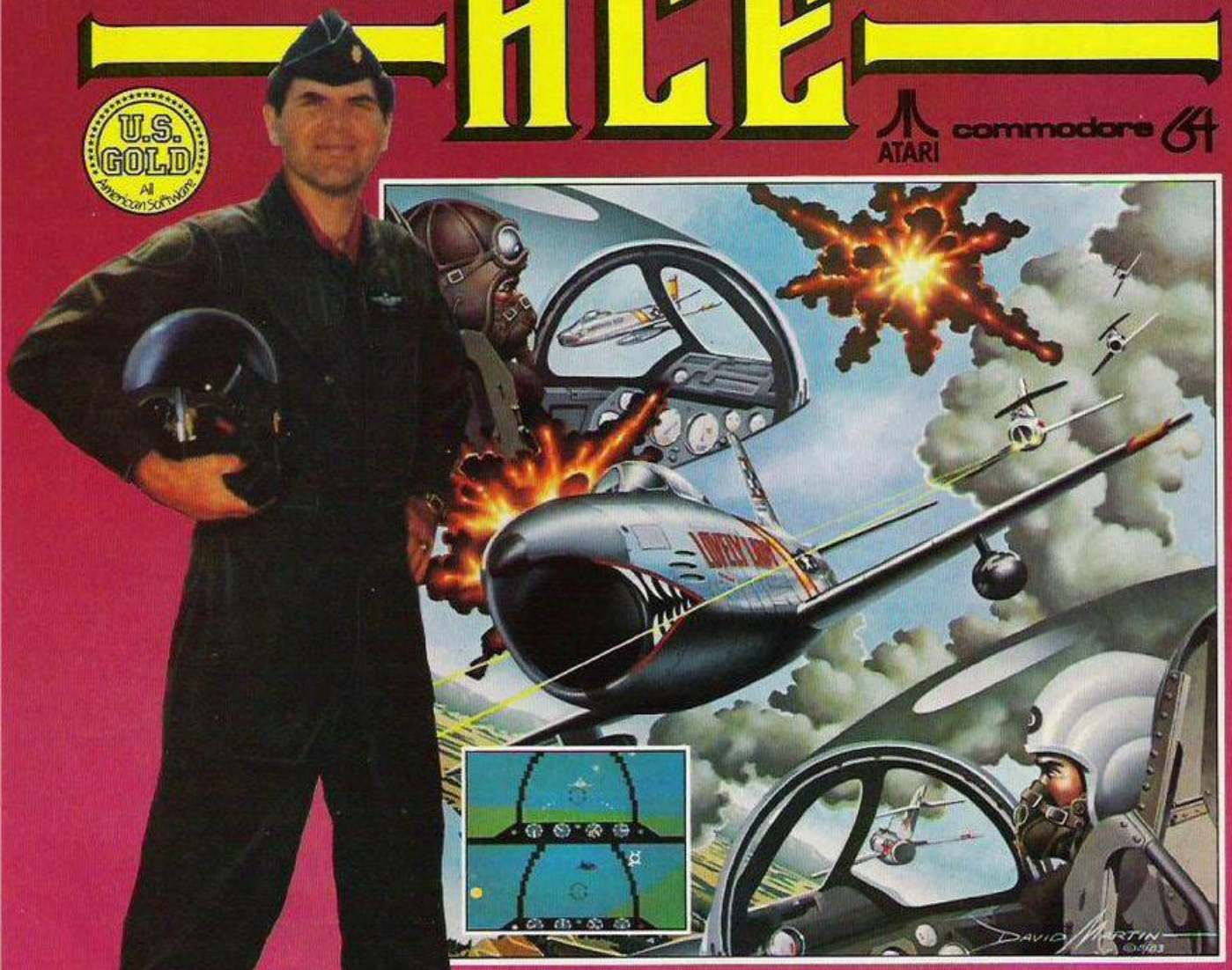
EXPERIENCE ONE TO ONE AIR COMBAT WITH MAJOR BILL STEALEY

UNIQUE TWO PLAYER COMBAT • 5 SIMULATED KOREAN WAR AIR BATTLES

MIG ALLEY ACE

ATARI commodore 64

U.S. GOLD
All American Software



OTHER TITLES AVAILABLE FROM **MicroProse**

CASSETTE **£9.95**

DISK **£12.95**

U.S. Gold Ltd., Unit 10, The Parkway Industrial Centre, Heneage Street, Birmingham B7 4LY. Telephone: 021-359 3020. Telex: 337268.

NEWS

The crystal ball

Incentive Software have released their popular Ket triology (Mountains of Ket, Temple of Vran and Final Mission) for Dragon owners. It comes on one cassette and costs £9.95.

Bored Of The Rings is an excellent parody adventure available on Microdrive or cassette for Spectrum owners. Mail order only from Delta 4 Software (04893 5800).

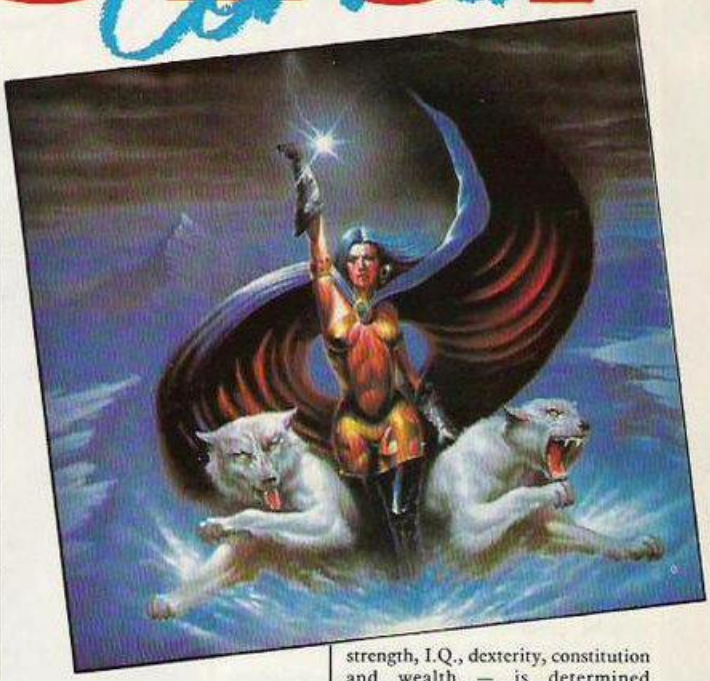
A helping hand

Fulvao Cerlesa of Rome is a great fan of English adventures. He had a spot of trouble with two of Scott Adams'.

In Spider-man:
Can't get the bio-gem
LLAH MORF MEGO IBTA BEWT OOHS
Electro a shocking problem?
ORTC ELEG NITT IHER OFEB SMRA S'KC OROT CODB ARG
In Sorcerer of Claymorgue Castle:
Can't open the book?
TFOL EHTM ORFT IPOR D
Battlement tin-can elusive?
KCIR BWOR HTNE HTLL EPSN AEDT SAC
Gary Blunden of Ongar can't shift the bear in Adventureland:
RAEB EHTT ALLE YTSU J
In Sutton Coldfield, M. Poynton is wrestling with Zork 1:
In the dark in the Drafty Room?
MOOR TFAH SMOR FTEK SABN ISTC EJBO REWO L
From Warrington, Andrew Parker is adrift in Zork 2.
What goes on the stands on the Wizard's workbench?
SERE HPSS SALG DERU OLOC EHTY RT
Yours in adventure adversity,
Hugo North

QUEST Corner

Our man with the brass lamp and the key to a thousand mysteries sheds light on new adventure programs. Lost? Never fear, Hugo North is here.



Key of Hope

- *Spectrum 48K*
- *Games Workshop*
- *£7.95*

FOLLOWING ON from the excellent Tower of Despair comes this latest atmospheric two-part text and graphics adventure from Games Workshop.

The adventure features over 400 locations — though only some are illustrated — and has beautifully designed manuscript-style text.

The White Goddess of Truth has requested your aid in the battle against the evil Malnor. You must collect the scattered pieces of the Key of Hope to defeat the Demonlord.

You begin, confused, at the ruins of Castle Argent. Nearby is a plain ring, a spirited, snow-white stallion and a glittering sunsteel sword. It's all too easy to get lost when you start to roam around but with luck you should find a talisman. Pity it's too hot to pick up, though.

You must find water quickly else your bones may soon lie bleaching in the sun and the search for the key over before it has barely begun. Your quest is definitely not going to be easy.

As before, a rich plot, plenty of locations and puzzles and fulsome prose. Highly recommended.

Mindshadow

- *Commodore 64*
- *Activision*
- *£19.99 — disc only*

IN MINDSHADOW, your aim is to find out your lost identity by working your way through a series of situations. The game sports some pretty impressive graphics of the locations but the adventure itself turns ou: to be a little on the dull side.

The early part of the game is set on a desert island. A little exploring soon uncovers such things as an abandoned hut, a wrecked boat, a cave and plenty of quicksand. As you quickly find, the only way to get off the island is to hitch a lift on a passing ship. Unless you've got a suitable bribe, the captain won't take you.

The adventure has a sophisticated command analyser and a wide vocabulary. Help is available by calling on a giant condor (I can't think why) who may assist you up to three times.

Not bad but at the price I can't see many people buying it.

Tyrann

- *Oric/Atmos*
- *No Man's Land*

CONFIRMING THE popularity of the Oric/Atmos with the French, here comes a Dungeons and Dragons type adventure imported from across the Channel.

Don't fret that you'll need GCE 'O' Level French to play the game — apart from a few system messages like "Un instant svp" and "Chargement en course" — Loading in progress, I presume — all text is in English.

The aim of the game is to guide a band of six characters through a large, monster-inhabited labyrinth. Your ultimate mission is left unstated. At the start of the game, you select and name your group from six types: each character can be a warrior, magician, thief or druid. Their quality of their abilities — strength, I.Q., dexterity, constitution and wealth — is determined randomly by the program.

Before you enter the labyrinth and whenever you return from the depths, you may visit the Emporium. Provided you have sufficient money, you can equip your party with various items such as weapons, armour, phials, parchments and spell books. Included in the list of 25 objects on offer are a white mouse and a baby dragon!

While above ground, you may also sell, swap or leave items and pay a visit to the Great Alchemist — who is excellent at First Aid.

Once in the maze, the display shows a stylised 3D view of the path ahead. Nothing visually exciting about this, just the usual perspective line drawings of walls and doors. As you move left, right or forward, the picture is updated.

The party may elect to camp and in so doing you can choose to catch 40 winks or inspect the current status of any member.

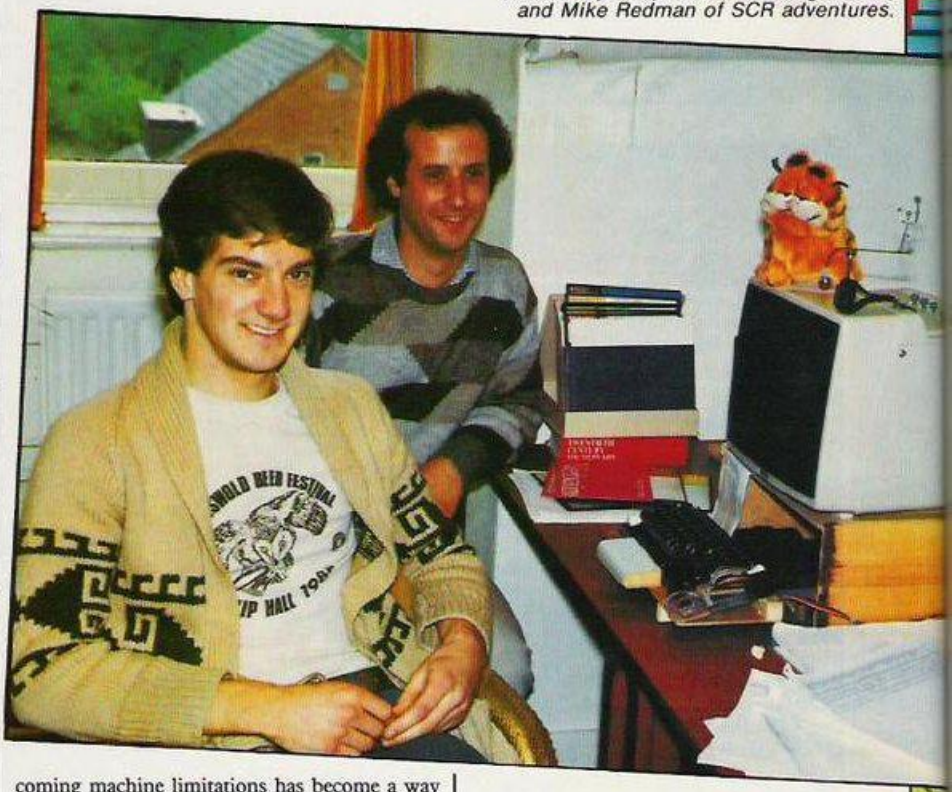
Apart from strolling round the maze, the only other activity is fighting. When you meet a group of monsters — they mostly come in groups and are only shown by name, not pictures — each character is given the option of parrying, fighting casting a spell or running for their life. Each round of the battle is then described. When all your band is killed, the game is over — but you can bring all of them back to life and start again.

Use of sound and graphics is minimal and the game content and format is hardly original.

BEATING THE YANKS AT THEIR OWN GAME

James Hartley discovers that the British are doing well in the latest software war against the U.S.A.

Mark Shepherd, in beer swilling T-shirt, and Mike Redman of SCR adventures.



THERE'S A MAN dressed up as a werewolf in one of Infocom's latest adventures. You might bump into him in the kitchen, or find him sidling up to you by the fireplace in the living-room for a chat. If he does, you might discover that he is married to that charming lady you met only a few minutes earlier at this high-society fancy dress ball. That lady is now lying dead in one of the adjoining rooms, strangled by the lariat from *your* costume and victim of a hideous crime in which you are the prime suspect.

Suspect, as the game is called, boasts a whole crowd of characters like the werewolf, most of whom you can communicate with in one way or another, and all of whom seem quite capable of going about their business quite independently of you, the player. The game is typical of a whole new generation of text-only adventures that are beginning to make some of our British adventures look pretty silly. If you've been introduced to Infocom — and it'll cost you upwards of £40 plus the disc drive to run the program on — then you'll understand immediately why Douglas Adams worked with Infocom on his excellent computer version of *Hitch-Hiker's Guide to the Galaxy.*

Different in a year or two

The reasons why Adams worked with Infocom are fairly obvious — a top-class software house working in an enormous domestic market — but in a year or two things will be quite different. British adventure programmers are fighting back and are now racing to develop new game systems that could end up making even Infocom look pale by comparison.

The main problem to date has been the hardware. Here in Britain hardly anybody has disc drives that can provide the sort of data storage needed for really complex games, and, unlike in the U.S.A., machines with larger memories, like the IBM, are scarcely thought of as *personal* computers. But, paradoxically, it's limitations like these that are now providing the basis for a new push forward in British adventure software.

"It's been very frustrating", says Pete Austin of Level 9 — generally reckoned to be Britain's leading adventure software house, "but overcoming machine limitations has become a way of life for British programmers, and it's helped us to develop techniques that could be very important when we have machines with discs and larger memories."

Pete's brother, Michael, is hard at work — with yet another brother, Nick — developing an entirely new adventure system that looks like giving the competition a good run for its money. In fact, he's already reached the point where he's no longer that impressed with Infocom.

"At the low programming level their games really aren't that clever. Their compression routines are virtually non-existent and I'm not at all impressed by the speed — especially on the Commodore. Our market here may be about two years behind, but as soon as discs become available, we'll be ready to make a huge leap forward."

Host of advanced features

The system that's being developed by Level 9 boasts a whole host of advanced features. First, a new compression system that uses a combination of stored dictionaries and character encoding — based on the frequency of different characters — makes possible a vocabulary of between one and two thousand words. Previously, adventurers have had to struggle with game with anything from 200 down to as little as 20 or 30 words.

Objects that you can manipulate during the game will no longer just be things you can pick up or drop — you'll be able to look inside them, or use them as containers to carry other objects from place to place, and of course there'll be plenty of characters to meet on the way.

"I'm trying to work towards a soap-opera type of game," says Pete, who tends to be responsible for the design of Level 9's games, "and I'm aiming to develop characters with whom the player can get emotionally involved. As memories get larger, there's no point in just adding more puzzles — you don't want people slaving away for more than a few weeks to solve a game. You're better off using the space for entertainment, and characters are a good way of doing it."

Although future Level 9 products will tend to get more and more sophisticated, the company is ensuring that programs don't become too slow and cumbersome. On the new Spectrum system that it is working with at the moment, the player can carry on entering commands while the graphics draw simultaneously. And where graphics are concerned, Pete sees new machines — like the new Atari range — as providing tremendous potential for the use of landscaping techniques, somewhat

similar to those pioneered by Mike Singleton in the very successful Lords of Midnight series.

Level 9 is perhaps the best known British adventure house, but it's not the only one to be hard at work on developing more powerful systems. One small company, which to date has produced only one game — Castle Blackstar, distributed by CDS — looks set to become a household name over the next couple of years with an adventure system that will certainly rival that of Infocom and could force Level 9 to look to its laurels. SCR Adventures is the brainchild of Mark Sheppard and Mike Redman, two enterprising 24-year-olds who graduated in Computer Engineering from the City University in London and are now hard at work on an adventure development system of truly epic proportions.

"Text is best"

"It's been so frustrating, having good ideas but not having the memory or the discs to produce them on," complains Mark Sheppard. "The computers in this country just haven't been up to it, but as soon as this country goes to disc we'll be ready to jump in." SCR's system has been developed using the language C, running under Unix, and although it's still early days, it already outperforms the system used by Infocom in the notorious Zork trilogy. Highly efficient compression systems and a very complex parser to interpret the users inputs both work together in a framework that can cope with multiple interactive characters, container objects, and even moving vehicles for the player to drive from one location to another in!

Unlike Level 9 and like Infocom, SCR is aiming at the text-only market. "Most adventure graphics just use the same basic forms over and over again," says Mark, "and what's the point of seeing the same tree in every location, even if it is a different size and in a different place. With text, you can have a different tree in each place." Always provided, of course, that the text can live up to what's expected of it but, judging from Castle Blackstar, its first release, SCR is quite capable of wielding the pen effectively, although both Mark and Mike seem rather hesitant to talk about Blackstar: "It's very dated now, and I don't like to be reminded of it," says Mark, although others obviously disagree — the game was recently voted one of the top 10 best adventures.

Some surprises

There are some surprises, too, to be found where new adventure systems are concerned. One company that isn't usually associated with adventures and which is keeping things very hush-hush is Mastertronics. It is hard at work on a system that comprises two basic modules, a database input/management system and control module to access the data and provide higher level game-play routines. Interestingly, the system has been developed using the Forth language.

Stephen Kirk of Mastertronics has nothing but praise for Forth: "We can have a library of primitives that access records, provide input/output, parsing, and so on. It's an extendable language and gives us a five-times saving in time over using assembly language." What's more, it enables them to develop software and

ADVENTURE

produce it simultaneously over a wide range of machines — essential in the British market where there are still substantial user-bases for what might normally be considered minority machines.

Adventure fans will doubtless be excited to learn that Mastertronic's new game is being designed by Sue Gazzard, who designed the very popular Lords of Time adventure for Level 9. It's also working, in conjunction with Roy Carnell, known to many adventurers as the man behind The Wrath of Magra, on an epic game that has been marketed by Mastertronics under the Mastervision label following the collapse of Carnell Software.

Mastertronics, however, is being careful not to leave cassette users behind in its search for bigger games. The company reckons that its system will be able to produce 250 location games plus graphics to run in Ram without discs, using only two separate loads from cassette — Wrath of Magra needed four separate loads.

Stephen Kirk reckons that their system will "just grow and grow. It'll give us a far greater diversity of input for our games, so we will be able to branch out into whole new areas, for example adapting ideas from books, films, and video, and accepting scripts from well-known writers" — like Douglas Adams, perhaps.

But the best news for the adventure player is yet to come. Although all the systems mentioned above will be used exclusively by the companies concerned to develop their own products — though perhaps from your ideas — there are also powerful programs to be released over the next year that will enable you to challenge Infocom at its own game!

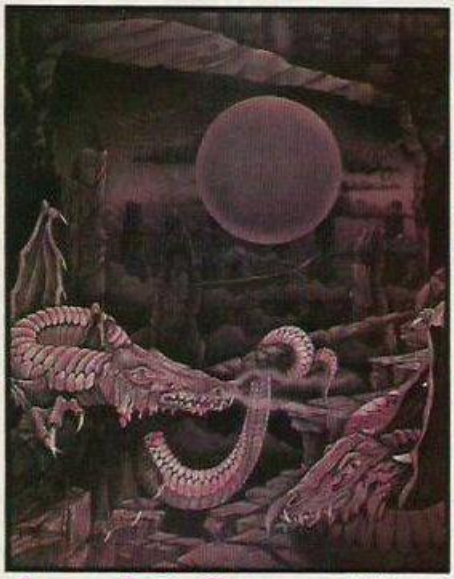
"It's more complex"

You may well be familiar with the popular *Exploring Adventures* series of books, published by Duckworth for a wide range of machines. The system in these books was concerned with simple two-word, verb-noun, Basic adventure programming, but now author Peter Gerrard is at work on an enhanced version which will, he hopes, be ready for release in September of this year.

"It's much more complex than the old system," says Peter, "and the majority of it is in machine code rather than Basic. The command parser is far more sophisticated and the location descriptions can be heavily compressed so you can fit more in." Peter also sees interactive characters as being very important to a good game: "If they work, they make it impossible to play the same game twice", he says, and he's currently working on

(continued on next page)

Red Moon



Level 9 Computing

ADVENTURE

Red Moon is Level 9's new release but don't read too much into the title even if Level 9 does share High Wycombe with a USAF bunker.

(continued from previous page)
a game in conjunction with his brother Mike that has got him very excited: "The results have been better than either of us could have done on our own," and with any luck, using Peter's new system, adventurers all across the country will soon be able to join in the fun. "After all," says Peter, "it seems silly to develop a system and then keep it all to yourself." If only everyone else felt the same way.

Last, but not least, there's the famous, or infamous, Quill. Produced by Gilsoft, this adventure development system has already introduced thousands to the enjoyable art of adventure programming, and it now seems very likely that an enhanced version of the program could become available in the not-too-distant future. "We are interested in producing a more advanced Quill", says Tim Gilbert of Gilsoft. "So far I've definitely felt frustrated — people have relied far too much on cassettes but now, at last, disc systems are becoming more widespread, and with machines like the QL we can have networked games and multi-user adventures, though I have my doubts about the QL's speed capabilities for more than about three fully-interactive characters."

Developing the Quill and the Illustrator graphics program for different machines is taking up a lot of Tim Gilbert's time at the moment, and he's understandably cagey about his plans for the future but, like Peter Gerrard, when he does come up with the goods, you can be sure that he won't be keeping it to himself.

HISOFT

High Quality Microcomputer Software

ULTRAKIT is the most powerful interactive toolkit yet for ZX BASIC. All the features you will ever need:

AUTO BREAK COPY DELETE EDIT FIND GRAB HIDE INFORM JOIN KEY LOSE MOVE NUMBER ONERROR PUT QSEPARATE RAMTOP SUBSTITUTE TRACE UPDATE VARIABLES WARN CRUNCH1 CRUNCH2 REMKIL PACKER MAP UCASE LCASE CTIME ATIME ALARM PRINTER KMODE RESET and much more. It comes with a FREE tape header reader.

C combines high-level structuring with direct control over the machine, all at compiled speed. Our compiler is now available from good retailers, and has proved extremely popular. It supports all statement types (plus inline code) and over 40 operators; whilst char, int, unsigned and combinations using pointers, arrays, structures, unions, functions, and typedef are all allowed data types. External and static variables can have initializers, whilst auto variables support recursion. There are six preprocessor directives and over 60 library functions with a selective inclusion scheme.

FONT 464 is an easy-to-use program enabling you to design, edit, and save your own characters and graphics for simple use in BASIC programs. There are 6 predesigned fonts and sophisticated printer-driving software which allows high-resolution screen dumps and letter writing on Epson compatibles or the DMP1.

DEVPAC is a complete machine code development package. It is the second one that many people buy, because after the first one they know what to look for! The 'front panel' debugger is the only way to really see programs in action, and assembly from multiple source files is fast enough to satisfy its most demanding users – ourselves.

Pascal is a valuable educational and development tool as well as running typically 40 times faster than a BASIC equivalent. Our compiler is an almost full implementation which compiles direct to machine code (no slow P-codes). Multiple file inclusion allows very large programs to be compiled.

MON QL is our latest product and our first on the QL; it was written by Andy Pennell, who has a great deal of experience on the QL. It is similar in style to the well-known MON 'front panel' in DEVPAC and includes additions like job control and multi-tasking support. It also catches system exceptions and includes fixes for QDOS.

Product Price Table

	Pascal £	DEVPAC £	C £	ULTRAKIT £	FONT 464 £
ZX Spectrum	25-00	14-00	25-00	9-45	
Amstrad CPC464	29-95	21-95			7-95
MSX	29-95	19-95			
CP/M-80	39-95	39-95			
Sharp	39-95	25-00			
Sinclair QL		19-95 (MON QL)			

All prices are for cassette versions (except CP/M and QL) and include VAT and p&p in the UK. Please contact us for export orders, disc formats or detailed technical information packs. All products are available by mail order: please send a cheque or Postal Order. Sorry, we do not accept credit cards.

HISOFT

180 High Street North,
Dunstable, Beds. LU6 1AT
Telephone (0582) 696421

the only choice

Kuma AMSTRAD CPC464 software

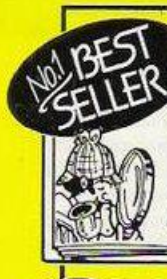
No.1 BEST SELLER

North Sea Bullion | Galaxia | Fruity Frank | Star Avenger | Shadow of the Bear

Home Budget | Database | Zen Assembler | Artwork | Bridge

• BOOKS

No.1 BEST SELLER



The Amstrad CPC 464 Explored
by John Braga

This superb book is designed to let every CPC 464 user, at whatever level, get the most from his computer. After an introductory section on the special Basic features, the book looks in depth at the excellent sound and graphic facilities.

NEW

ZEN and the Amstrad CPC 464
by Ian R. Sinclair

This book covers the CPC 464 itself, a detailed guide to Zen, an introduction to the Z-80, ROM, and RAM, subroutines, screen and keyboard, cassette I/O and how to plan a program. The text is littered with illustrations, diagrams and helpful program examples.

An outstanding selection from Kuma's rapidly expanding range of Entertainment and Application Software for the Amstrad CPC 464 Micro-computer.

Now available from selected branches of Co-op, Granada, LASKYS and John Menzies

Kuma Computers Ltd., Unit 12, Horseshoe Park, Horseshoe Road, Pangbourne, Berks RG8 7JW.

Please send full catalogue on Amstrad CPC464 products.

Name .....
Address .....
.....
..... Phone.....

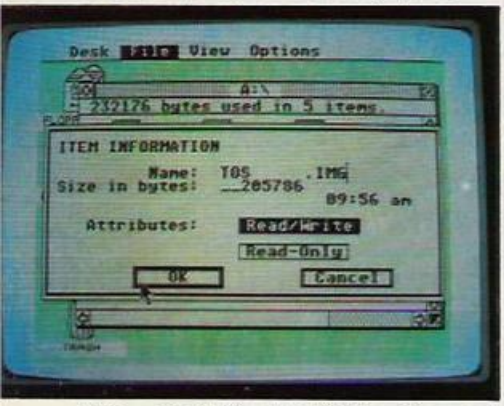
I own an Amstrad CPC 464 computer ☐

Trade Enquiries Phone 07357-4335

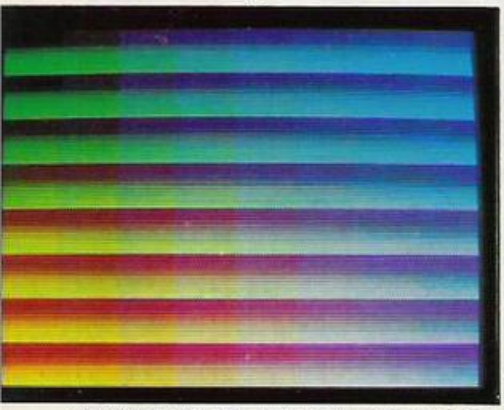
Visitors wishing to call at our Pangbourne Manufacturing and Distribution Centre are advised to phone 07357-4335 first for an early appointment.

DR Logo will be built in on Rom.

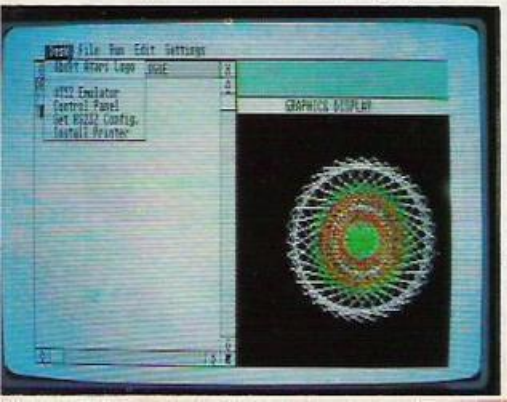
A cat for the mouse — hi-res graphics.



Gem — controlling the WIMP environment.



Op Art on the ST and below Logo graphics.



SUPERMICROS

FEW COMPUTERS HAVE generated as much interest as Atari's ST range, first announced in January. The 130ST, in particular, promised most of the features the average home computer owner would want to see in an ideal machine: 128K Ram, a powerful 16-bit processor, tremendous high-res graphics, an extensive array of ports, a high capacity disc drive, a Midi interface, and a mouse — at an unprecedentedly low price; not much more than the cost of a BBC. And to clinch the matter the ST computers run Gem, Digital Research's Graphics Environment Manager.

Gem is an operating system which gives the STs all the capabilities of Apple's Macintosh — icons, windows and pull-down menus under the control of a mouse. Unlike the Macintosh system, Gem has the advantage of being able to use colour and is already running on a number of other computers such as the IBM PC and the Apricot. Software written for other machines can be converted to the Atari fairly easily.

For the moment, however, the 130ST will not be sold in this country, and the machine we looked at, the 520ST, will cost somewhere between £750 and £800. This price may seem to be way outside the budget of most home users but it includes a 500K 3.5in. disc drive, a high-res monochrome monitor, 512K Ram, and a mouse. Along with the hardware there is an impressive list of software: TOS — the Tramiel disc Operating System, Gem, Gem Desktop, Gem Write, Gem Paint, DR Logo and DR Personal Basic.

With the exception of Tos these programs have been bought under license from Digital Research. But the problem of tailoring them to fit the ST seems to be taking longer than Atari anticipated. DR Basic, for example, which is being converted to give the user access to Gem's graphics, is not yet running. On the review unit the software was loaded in from disc. When the 520ST appears in the shops in September the software will be held in 192K Rom.

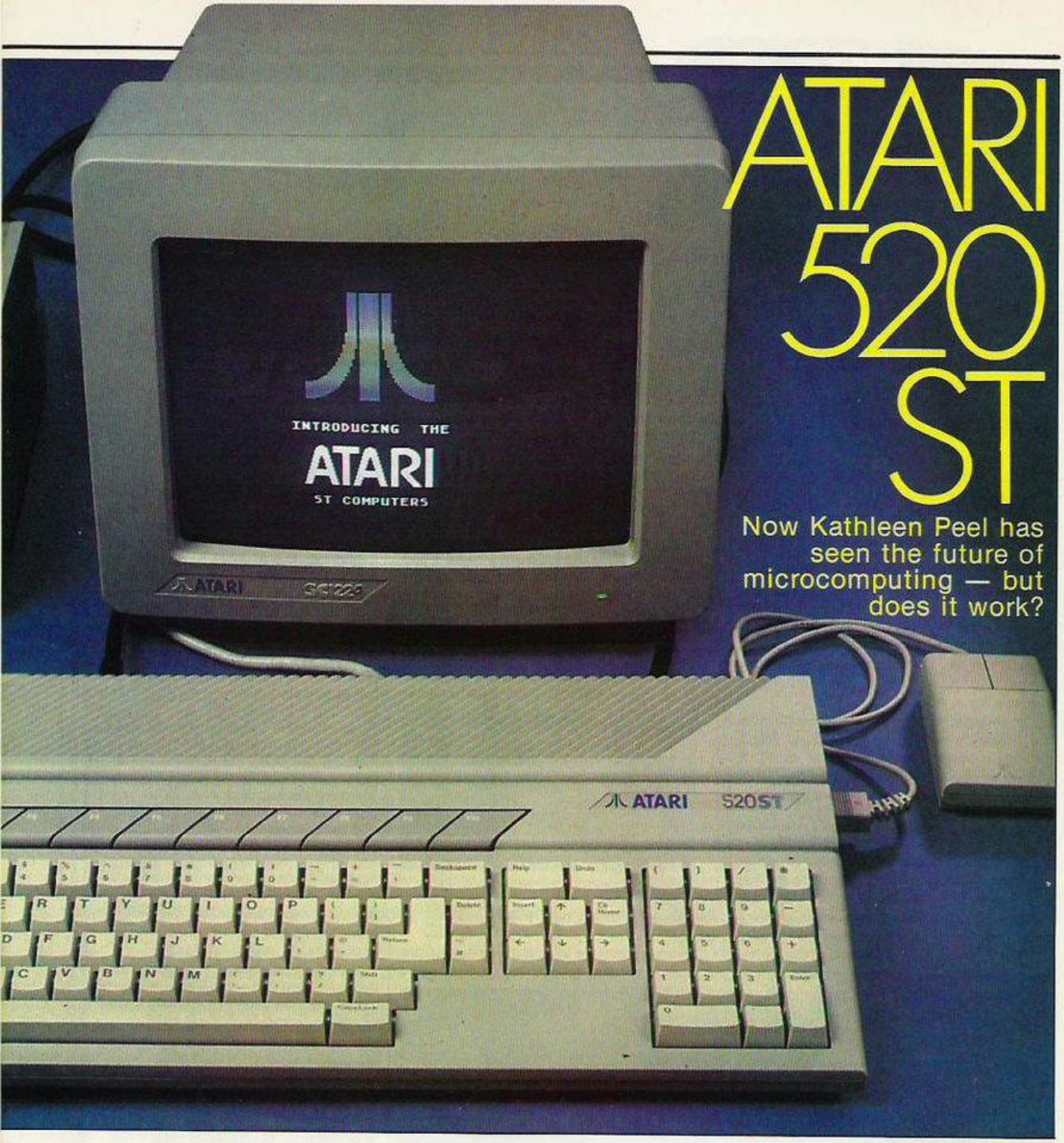
The computer and the peripherals have a common styling which looks businesslike, but tends to take up a lot of desk space. The keyboard unit is large — the price you have to pay for a nicely-spaced keyboard layout. The quality of construction of the computer and peripherals is good with no signs of patching.

Inside, the processor is a Motorola MC-68000 running at 8MHz and capable of addressing 16Mbytes of contiguous Ram. This is perhaps the best of the 16-bit devices, but do not make the mistake of thinking that 512K Ram is equivalent to 512K in an eight-bit processor environment. Code is stored as a minimum of two bytes — a word — and invariably a lot more memory space will be used. The overall effect will be to gobble up memory, and there is no means of externally extending the 512K Ram. For those readers used to eight-bit machine-code programming, a ratio of 75 percent seems about the effective memory for comparable programs.

The Atari ST contains the following peripheral support chips: a 6301 which scans the keyboard, mouse and joystick ports, buffering the data in the keyboard queue; an MC-68901 which services communications and interrupts; a FD1772, floppy-disc controller supporting up to two drives; and the YA-2149, Yamaha's equivalent of the Texas AY-3812 sound chip. An MC-6580 provides the interface for the Midi functions and another MC-6580 provides the RS-232 interface.

In addition there are four special Atari ULAs which function as memory management, DMA, ancillary functions and graphics. There is no hardware character generator — it is all done in software. The memory chips consist of 16 256K Ram devices and six 32K Eproms.

The U.K. keyboard sports an extra key compared to the American computer. The left-



ATARI 520 ST

Now Kathleen Peel has seen the future of microcomputing — but does it work?

hand shift key has been split in two, to allow the £ sign to be shift-4 and hash to be repositioned. The keyboard consists of a 60-key typewriter-style portion, an eight-key cursor control, portion, an 18-key numeric keypad and 10 function keys. The keyboard feel is uniform, consistent and eminently suitable for word processing activities.

There is no internal speaker and the sound is reproduced from the attached display unit speaker. Nor is there a battery back up to the internal clock which must be set at switch on to provide accurate data/time stamps to files.

The external connections are numerous and will meet most requirements, the only notable omission being the inability to add on more memory externally.

The peripheral ports include two joystick ports on the right-hand side, one configured for a mouse. On the back are a reset button, on/off button and power supply socket, Midi in, Midi out five-way Din sockets, TV, monitor — composite and RGB — 25-way RS-232 socket, Centronics which also functions as an eight-bit bi-directional port, floppy disc controller, a 19-way D-shell direct memory access port that can be used for the attachment of a hard disc and a Rom expansion port on the side.

The Midi interface acts as a sequencer and can be used to perform step, time, note and trigger data entry. The Midi interface can also be used as a network link — as can the bi-directional Centronics port, the RS-232 and the hard disc port.

There are a number of high-level languages available — DR Logo, Forth, C, Assembler — but unfortunately the one I wanted to see was unavailable — DR personal Basic.

It seems strange to offer Logo at this level. Presumably Atari wants to attract educational users. My own view is that this and most other high-level languages are irrelevant to the real world: academics may favour the language but being an experienced Logo programmer will not earn you any credit with employers. Basic, by contrast, is a language that is likely to survive, and provides a useful general programming background; Cobol and Fortran are, likewise, still relevant for commercial and enginering applications; while C is the language

(continued on next page)

(continued from previous page)
for the future — most software tools, including Gem and CP/M 68K, seem to have been written in it.

The other software supplied with the ST includes Gem, Digital Research's integrated operating system. Gem provides an initial interface between the operator and the machine through icons, pictorial representations of facilities or devices the operator wishes to use. Move the cursor over a symbol of a dustbin to indicate that the current document is rubbish and no longer required, press the mouse trigger and its gone! Well it saves typing New.

Mouse action smooth

The Mouse action appears smooth and is placed over the icon and the trigger pressed to select an activity.

Gem Desktop provides the working shell that allows loading, copying and general housekeeping. Gem Write is a word processor based on Volkswriter and Gem Paint, is a similar program to Macdraw.

There are three graphics modes, 320x200 in 16 colours, 640x200 in four colours, both from a pallette of 512 colours and 640x400 monochrome. Although the windows and their contents were capable of being moved virtually instantaneously using the menu data buffer, there were times when listing text seemed relatively slow. This is probably caused by making calls serviced through multiple layers of operating systems.

The sound generator has one noise channel and three tone channels. Easy Basic access through a macro language similar to MSX machines, one of the few parts of the MSX specification that I like, is not available.

50 titles being developed

The number of applications that currently run under Gem is very small, but there are well over 50 titles being developed by U.K. software houses alone. Atari intends to keep software prices under $100 for a single piece of software and hopes that $50 will be nearer the norm. A Telex emulator is being developed and should soon provide the ST with yet another use.

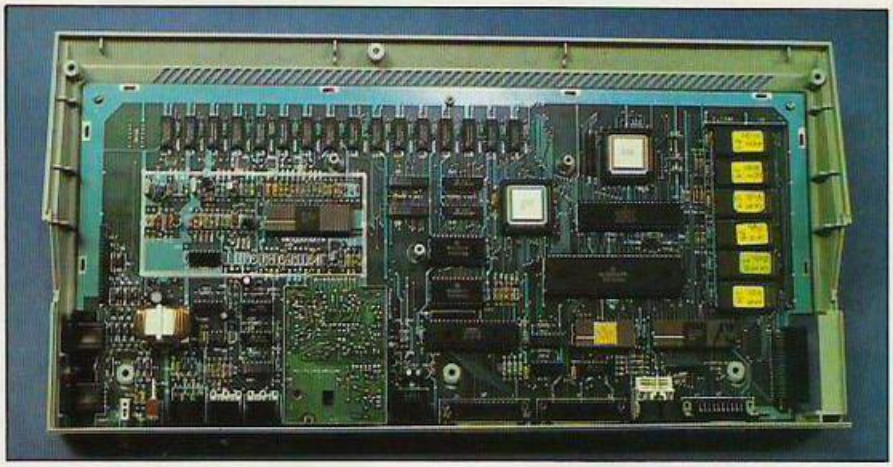
Documentation for software developers from Digital Research appears to be comprehensive and of high technical quality, hopefully forming a good platform on which to base the Atari manuals.

The Atari discs are 3.5in. Epson floppy drives. The SF354 gives 500K and the SF314, 1Mbyte unformatted storage. To load the TOS image file of 200K took approximately 35 seconds which is a very reasonable figure for low-cost drives.

Monitor display good

The monitor display quality was good, but was limited to 640x200 maximum by a protection circuit which is employed to prevent phosphor "burn-up" in low and medium resolution monitors caused by the higher frame rate used in high-resolution mode. One of the ST's unusual features is that it checks to see what sort of monitor is attached — RGB or composite video. It then selects the graphics mode appropriate to the monitor's resolution.

Gem provides an integrated operating system approach which is very successful in providing a simple entry to computing for the uninitiated. But at this level, it is the application packages that provide the user-friendly aspects of the program, the operating system shell ensuring a common approach. PC-DOS compatibility is really limited to data files only, it is unlikely that programs will actually run. ■



The Opposition

QL, the QL has 128K RAM, costs £400 and comes complete with adequate software. Adding a b/w monitor and enough memory to reach 512K and takes you up to £800. On that basis, it's not worth thinking about. The only reason for buying a QL is the £400 entry price if you already have a monitor or TV and the 48-hour software support that comes with the machine, a very important item not to be underestimated. All software is likely to run in the 128K, and some good packages are beginning to appear.

Apple's Macintosh, at about twice the price and limited to black and white, is the machine on the business side that the Atari ST is most likely to challenge.

Take your pick: .5Mbyte or 1Mbyte.

Spot the Midi — a DIN's eye-view.

IBM PC. The Atari ST has the ability to run in PC mode and use some PC data files. It is unlikely that PC DOS programs will run on the Atari.

Act Apricot F1E, at its current price of £600 for a 16-bit 8086 computer, with 128K RAM, CP/M 86, Basic and a 315K formatted 3.5in. Sony disc, does seem rather good value when you consider the wealth of software available. The Apricot F1 is available for about £1,000 and has the considerable advantage of also running MS-DOS, 256K Ram, a 1Mbyte unformatted disc and a substantial set of software packages. Not quite as good a hardware specification.

Commodore's Amiga is the cloud on the ST's horizon and on a technical level, the only other reasonable alternative besides the Apricot.

CONCLUSIONS

- The software problems will be fixed as the computer is systematically debugged and there is no inherent problem with the hardware. All comments relate to Rom details but what should not be underestimated is the time it will take to fully debug the amount of software provided. It is not a three-month exercise as the cause of every obscure fault must be diagnosed and the cure tested to ensure that it does not have any effect on associated code.
- The current market has been filled by products that were used either to:
  a) Teach someone about computing.
  b) An upgrade.
  c) For a specific applications games, or business packages. Further market penetration is becoming increasingly more difficult for new products as they vie for new market sectors. Obviously there is a huge market out there that I believe is extremely price-sensitive, and £800 is getting very close to the limit for a budget-priced serious micro.
- The 520ST is technically excellent. I understand why the 520ST was the first device to appear in the States where disposable income is higher, but in the U.K., the machine that I feel could have made Atari a fortune is the 130ST, provided it ever makes an appearance and at its launch price.
- The 520ST hardware is the new standard by which others will be judged. Do not worry too much about the software problems. They may take time to debug but when they have been, this will be a very good computer.

Cash & Carry COMPUTERS

TOP SHOWROOM SERVICE

ROCK BOTTOM PRICES

PERSONAL CALLERS WELCOME AT OUR EXTENSIVE SHOWROOMS
MOST EQUIPMENT ON DEMONSTRATION

➡➡➡ Even further price reductions this month are indicated with an arrow ➡➡➡

The UK's Best Printer Prices

Only a sample of our massive range of printers shown here — phone for further details

DAISYWHEEL LETTER QUALITY		
➡ Juki 6100 (P)	£319.90 + VAT =	**£367.89**
➡ Brother HR15 (P)	£315.90 + VAT =	**£363.23**
➡ Daisystep 2000 (P)	£219.90 + VAT =	**£252.89**
Smith Corona TP1	£179.90 + VAT =	**£206.89**
PRINTER/TYPEWRITERS		
Brother EP44 (S)	£189.90 + VAT =	**£218.39**
Modems available for Easylink and Telecom Gold		
Juki 2200 Daisywheel (P or S)	£259.90 + VAT =	**£298.89**
DOT MATRIX PRINTERS		
➡ Brother M1009 (P)	£159.90 + VAT =	**£183.89**
Brother HR5 (P or S)	£129.90 + VAT =	**£149.38**
➡ Canon 1080A NLQ (P)	£289.90 + VAT =	**£333.39**
➡ Canon 1156A NLQ (P)	£365.90 + VAT =	**£420.79**
➡ EPSON RX80 (P)	£190.90 + VAT =	**£219.54**
➡ EPSON RX80 F T PLUS (P)	£215.90 + VAT =	**£248.29**
EPSON RX80/FX100/RX100	POA	
EPSON LX80 NLQ (NEW MODEL)	£239.90 + VAT =	**£275.89**
➡ Kaga Taxan KP810 NLQ (P)	£259.90 + VAT =	**£298.89**
Kaga Taxan KP910 NLQ (P)	£379.90 + VAT =	**£436.89**
Oki-Mate 20 Colour	£235.90 + VAT =	**£271.29**
➡ Seikosha GP500A (P)	£113.90 + VAT =	**£130.98**
Shinwa CTA80 (P)	£199.90 + VAT =	**£229.89**

(P) = Parallel-Centronics (S) = Serial RS232

Smith Corona range of printers. Now in Stock — Phone or write for details. New Low Prices.

South London's Largest Range of Computer Software — Games, Business, Educational — Top Titles always in stock.

SUPERDISKS

LONDON'S LOWEST PRICES ON FLOPPY DISKS

Prices per box of ten ex VAT

	SSDD 40TR	DSDD 40TR	SS96TP1 80TR	DS96TP1 80TR
BASF 5¼"	£10.00	£17.80	£18.50	£21.00
3M 5¼"	£13.50	£19.50	£19.90	£23.90
VERBATIM 5¼"	£14.50	£18.40	£18.40	£24.50
DYSAN 5¼"	£15.90	£23.50	£23.50	£28.50
TDK 5¼"	£17.50	£16.90*	—	£32.00
3M/BASF 3½"	£34.90			

*Exclusive offer

Add 70p for P&P per box of 10 disks

CASH & CARRY COMPUTERS
53-59 High Street,
Croydon, Surrey CR0 1QD.

12" MONITORS — GREEN SCREEN		
Sanyo 2112 Med Res.	£65.00 + VAT =	**£74.75**
Sanyo 8112 High Res.	£88.00 + VAT =	**£101.20**
14" MONITORS — COLOUR		
Commodore 1701 Composite/Sound	£173.00 + VAT =	**£198.95**
Fidelity CM14 RGB/Comp/Sound	£169.00 + VAT =	**£194.35**
Microvitec 1431DS Norm Res RGB	£169.00 + VAT =	**£194.35**
Microvitec 1431DZ for ZX Spectrum	£199.00 + VAT =	**£228.85**
Microvitec 1451DS Med Res RGB	£229.00 + VAT =	**£263.35**
Microvitec 1451DQ for Sinclair QL	£234.74 + VAT =	**£269.95**
Microvitec 1441DS High Res RGB	£379.00 + VAT =	**£435.85**
Sanyo 3125 Norm Res RGB	£173.00 + VAT =	**£198.95**
Sanyo 3117 Med Res RGB	£285.00 + VAT =	**£327.75**
Sanyo 3115 High Res RGB	£399.00 + VAT =	**£458.85**
Commodore		
Plus 4 NEW 64K Computer	£126.92 + VAT =	**£145.95**
Commodore 64	£165.17 + VAT =	**£189.95**
SX64 Portable inc D. Drive and Col. Monitor	£478.22 + VAT =	**£549.95**
C2N Cassette	£32.61 + VAT =	**£37.50**
1541 Disk Drive	£173.87 + VAT =	**£199.95**
DPS1101 Daisywheel Printer (by Juki)	£309.95 + VAT =	**£356.44**
801 Tractor Printer	£139.09 + VAT =	**£159.95**
803 Friction Tractor Printer	£173.87 + VAT =	**£199.95**
1702 Colour Monitor	£173.87 + VAT =	**£199.95**
Amstrad		
CPC 464 Green Monitor inc. FREE software	£208.65 + VAT =	**£239.95**
CPC 464 Colour Monitor inc. FREE software	£301.00 + VAT =	**£346.15**
CPC 664 Green Monitor inc Disk Drive	£286.91 + VAT =	**£329.95**
CPC 664 Colour Monitor inc Disk Drive	£382.56 + VAT =	**£439.95**
Atari		
130XE 128K	£139.09 + VAT =	**£159.95**
Acorn/BBC		
➡ Acorn Electron	£108.65 + VAT =	**£124.95**
➡ BBC Model B	£289.00 + VAT =	**£332.35**
➡ Model B inc Disk I F	£345.90 + VAT =	**£397.79**
Full range of **CUMANA Disk Drives** in stock at **Very Low Prices.**		
Sinclair		
➡ QL 128K Computer	£321.69 + VAT =	**£369.95**
➡ NEW Spectrum 48K PLUS	£104.30 + VAT =	**£119.95**
Microdrive + Interface 1 + 4 Free Programs	£82.60 + VAT =	**£95.00**
16K-48K Upgrade	£21.70 + VAT =	**£24.95**
MSX Computers		
➡ Toshiba HX10 64K	£147.78 + VAT =	**£169.95**
➡ Sanyo MBC10 64K	£156.48 + VAT =	**£179.95**
➡ Sony HB75B 64K	£217.35 + VAT =	**£249.95**
JVC HC7GB 64K	£226.04 + VAT =	**£259.95**
Full range of MSX accessories available		

Apricot Computers
Fantastic Low Prices — All models in stock:
F1 • Apricot PC • Xi • Portable
PHONE NOW!

Mail Order + Export + Trade
Hot Line Phone 01-686 6362

Delivery by Securicor (3 day) please add £5.00 + VAT per item.
Delivery by T.N.T. (overnight) please add £9.50 + VAT per item.

Send off the coupon or order by 'phone quoting your Access, Barclaycard No. 'Phone 01-686 6362. Immediate despatch on receipt of order or cheque clearance.

Or you can Telex your order on: 946240 Attn 19001335

We accept official orders from PLC's, Government Departments and Educational establishments

These prices correct until superceeded by next advertisement.

To: Cash & Carry Computers, 53-59 High Street, Croydon, Surrey CR0 1QD.

Please supply _____

I enclose my cheque for £ _____ including delivery by Securicor/T.N.T.*

or charge my Access/Barclaycard No. _____

Name _____ Signature _____

Address _____

*Please Delete YC 7 (Vision Technology Ltd)

Herbie Briggs has just destroyed the myth that all floppy discs are created equal.

They seem equal. Until you look at the seams.

That's where equality ends.

Most companies seal their discs with a spot here, a spot there. Leaving most of each seam not sealed at all.

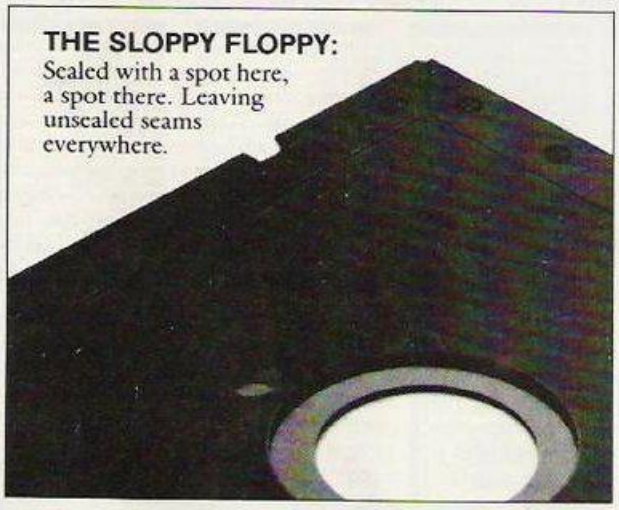
Sooner or later, the seams might do what comes naturally: they bulge. Warp. Pucker. Open up.

Pens, pencils, fingernails—even a four-year-old's, like Herbie—can catch and snag in those wide open spaces.

That's sloppy. And dangerous. Because if you put a sloppy floppy into your disc drive, it can jam your drive. Ruin your drive head. Lose your data.

So much for their seams. Ours are different.

THE SLOPPY FLOPPY:
Sealed with a spot here, a spot there. Leaving unsealed seams everywhere.

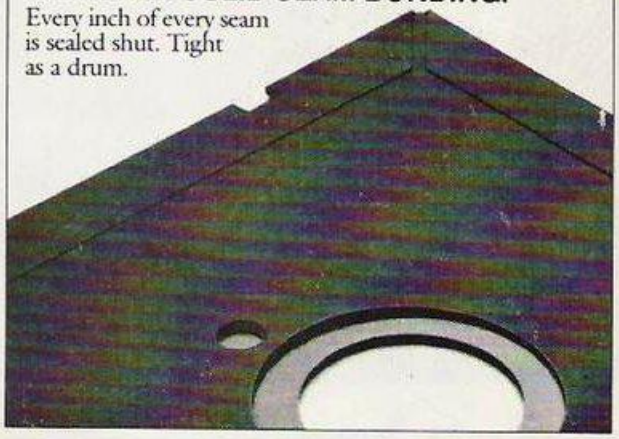


Memorex uses a process we developed, called Solid-Seam Bonding.

Solid-Seam Bonding seals shut every inch of every seam of every Memorex* floppy disc. Tight as a drum. That makes the Memorex floppy stiffer. Stronger. And your data safer.

To resist bulging, warping, puckering, or opening up.

MEMOREX SOLID-SEAM BONDING:
Every inch of every seam is sealed shut. Tight as a drum.



To resist all the things that can jam your drive, ruin your drive head, or lose your data.

Which proves that a Memorex floppy disc isn't equal to all the others. It's better.

Solid-Seam Bonding is just one example of the extra care that goes into every Memorex floppy disc. Be it 8," 5¼" or the new 3½." Extra care that lets us guarantee every Memorex disc to be 100% error-free.

The next time you're buying a floppy disc—or a few hundred of them—just remember this:

It's always better to be safe than sloppy.

For more information on the full line of Memorex quality computer media products, including computer tape, call Memorex U.K. Ltd., 96-104 Church Street, Staines, Middlesex. Tel: 0784 51488

Your Data. When it matters, make it Memorex.™

MEMOREX

Memorex is a registered trademark of Memorex Corporation.
© 1984 Memorex Corporation
A Burroughs Company

BBC USERS TOO GOOD TO MISS

30,000 people save time

30,000 people save money

30,000 people belong to BEEBUG

the user group for BBC micro users run by BBC micro users.

Find out why

Find out how

Telephone (049481) 5228 (24 hr) for a **free** information pack (UK only)

or write to BEEBUG, Dept 4, PO Box 109, High Wycombe, Bucks.

SPECIAL OFFER

3½" FUJI Microdisks

SS/DD **£29.95**

DS/DD **£39.95**

5¼" FLOPPY DISKS

Suitable for use on nearly all single and double-sided 5¼" disk systems.

- Replacement Guarantee
- Hub rings
- Boxed in 10s

PRICES PER BOX

DS/DD	1-4	5-9	10+
	9.90	9.00	8.60

PRICES PER BOX

	1-4	5-9	10+
SS	29.95	29.50	29.10
DS	39.95	39.30	38.70

Full Lifetime Guarantee

99P EACH (Based in 10s) EXCL VAT

REPLACEMENT GUARANTEE

If any disk should fail, return it for free replacement..

SEE10 LIBRARY CASES (Hold 10 disks)

	1-4	5-9	10+
5¼"	1.99	1.85	1.75
3½"	1.99	1.85	1.75

DELIVERY

	1-4	2-4	5+
Disks (per box)	75p	50p	40p
Library Cases (Free with disks)	60p	30p	25p

HOW TO ORDER

To total order value add Delivery, then add 15% VAT and send to:

IDS Computer Supplies

P.O. BOX 436, BANCROFT, MILTON KEYNES MK13 0QX. Tel: (0908) 310896.

IT'S WITS

SPECTRUM

DUN DARACH	8.00
DAILY'S SUPER TEST	5.50
ARCHON	8.50
TAPPER	6.50
SHADOWFIRE	7.50
STREET HAWK	5.50
A VIEW TO KILL	8.50
JET SET WILLY II	6.00
CAULDRON	6.50
ROLAND'S RAT RACE	5.50
CATS	5.50
SOFTEK'S ARTIST	11.00
THE CHOCOLATE FACTORY	7.50
WRIGGLER	4.50
WARLORD	5.50
KOMPLEX CITY	8.00
RUNESTONE	6.50
LEONARDO	7.50
BROAD STREET	6.50
SUPERCODE III	11.00
SYSTEM 1500	7.50
FOURTH PROTOCOL	11.00
HOCKY HORROR SHOW	7.50
WORLD'S BASEBALL	5.50
MINI OFFICE	4.50
ARNEHAM	7.50
PSYCHEDELIA	5.00
ONE ON ONE	7.50
MONTY ON RUN	5.50
HERBERT'S DUMMY RUN	7.50
RED ARROWS	7.50
ALIEN	7.00
ALIEN 8	7.50
ANIMATED STRIP POKER	5.50
FORMULA ONE	6.00
FRANKIE GT HOLLYWOOD	7.50
GRAND NATIONAL	5.50
GYRON	7.50

AMSTRAD

ANIMATED STRIP POKER	6.95
ALIEN 8	7.50
KNIGHTLORE	7.50
COMBAT LYNX	6.95
CONFUZION	5.50
D T DECATHLON	6.50
MINDER	7.50
DARK STAR	5.95
EMERALD ISLE	5.75
FIGHTER PILOT	6.50
GHOSTBUSTERS	8.95
HUNCHBACK II	6.50
JET SET WILLY	6.50
KONG STRIKES BACK	6.50
LEVEL 9 ALL	7.50
MINI OFFICE	4.75
PINBALL WIZARD	6.50
PYJAMARAMA	5.50
QUIL	13.50
RING OF DARKNESS	7.50
SORCERY	6.50
starstrike 3D	5.50
WORLD CUP FOOTBALL	5.95
TANKBUSTERS	5.95
GUN DARASH	7.50
FLIGHT SIMULATION	10.50
MILLIONAIRS	5.50
FOOTBALL MANAGER	5.95
INTERCEPTOR ALL	4.50
ARCHON	8.95
HOBBIT	10.95
ARTIST	7.50
DEATH PIT	5.50
DEFEND OR DIE	6.50
MASTERFILE DISK	26.00
MICROPEN DISK	45.00
MICROSPREAD DISK	45.00
AZIMUTH ADJUST KIT	6.95

COMMODORE 64

STRANGELOOP	6.95
JET SET WILLY II	6.95
QUASIMODO	7.50
BLAGGER GT HOLLYWOOD	7.50
BOUNTY BOB STRIKES	7.50
CAULDRON	6.50
EVERYONE'S A WALLY	7.50
GREMLINS	7.50
LEVEL 9 ALL	7.50
M.U.L.E. DISK	12.00
MASTER OF LAMPS	7.50
MIND SHADOW DISK	16.00
HOBBIT DISK	15.00
MINI OFFICE	4.75
MOON CRESTA	5.50
ON-COURT TENNIS	8.95
ON-FIELD FOOTBALL	8.95
STAR BASEBALL	8.95
PITSTOP II	8.50
WORLD'S BASEBALL	5.95
ROLAND'S RAT RACE	6.50
SHADOWFIRE	7.50
SPITFIRE 40	7.50
SUPER HUEY	8.95
THEATRE EUROPE	7.50
ENTOMBED	7.50
JUMP JET	7.50
REALM IMPOSSIBILITY	7.50
ELITE	10.95
DAMBUSTERS	7.50
HERBERT'S DUMMY RUN	7.50
A VIEW TO KILL	8.95
INT. BASKETBALL	4.95
GRIDS REVENGE	7.50
EXPLODING FIST	7.50
ALL INFOCOM DISKS	35.00
GRIBBLY'S DAY OUT	6.50
GATES OF DAWN	6.95

BBC

REVS	12.50
GRAPHICS ROM	30.00
KNIGHTLORE	7.50
ALIEN 8	7.50
WIZADORE	6.50
HAMPSTEAD	6.50
LEVEL 9 ADVENTURES	7.50
COMBAT LYNX	6.50
MINI OFFICE	49.50
GREMLINS	6.50
ELITE	11.95
CASTLE QUEST	10.95
ATIC ATAC	7.50
REPTON	7.95
BRIAN J CHALLENGE	5.95
ARABIAN KNIGHTS	5.50
SCRABBLE	9.95
WORDWISE PLUS	50.00
DISC DOCTOR	30.00

ATARI

DRIPZONE	7.95
DECATHLON	7.50
PITFALL 2	7.50
POLE POSITION	7.95
BRUCE LEE	11.00
BOULDER DASH	12.95
SMASH HITS	13.00
ZAXXON	11.00
HITCHHIKER'S DISK	30.00
BEACH HEAD DISK	30.00
DIG DUG	7.95
PAINT DISK	32.00
MILLIONAIRE DISK	40.00
BANK ST WRITER DISK	55.00
ALL INFOCOM DISKS	35.00
ULTIMA III DISK	45.00
FLIGHT SIMULATOR II	45.00
BLUE MAX	7.95
RETURN TO EDEN	7.95

MSX

ZAXXON	10.50
NORSEMAN	7.50
THE WRECK	12.50
BUCK ROGERS	10.50
TASWORD	17.00
CHUCKIE EGG	6.50
BLAGGER	6.50
CLASSIC ADVENTURE	5.50
THE HOBBIT	12.95
GHOSTBUSTERS	10.50
PITFALL 2	10.50
HYPER SPORTS	14.00
TRACK & FIELD	14.00
CIRCUS CHARLIE	14.00
JET SET WILLY	8.95
SORCERY	7.50
SUPER COBRA	14.00
MONKEY ACADEMY	17.00
YIE AR KUNG FU	16.00

Cheques/PO payable to: IT'S

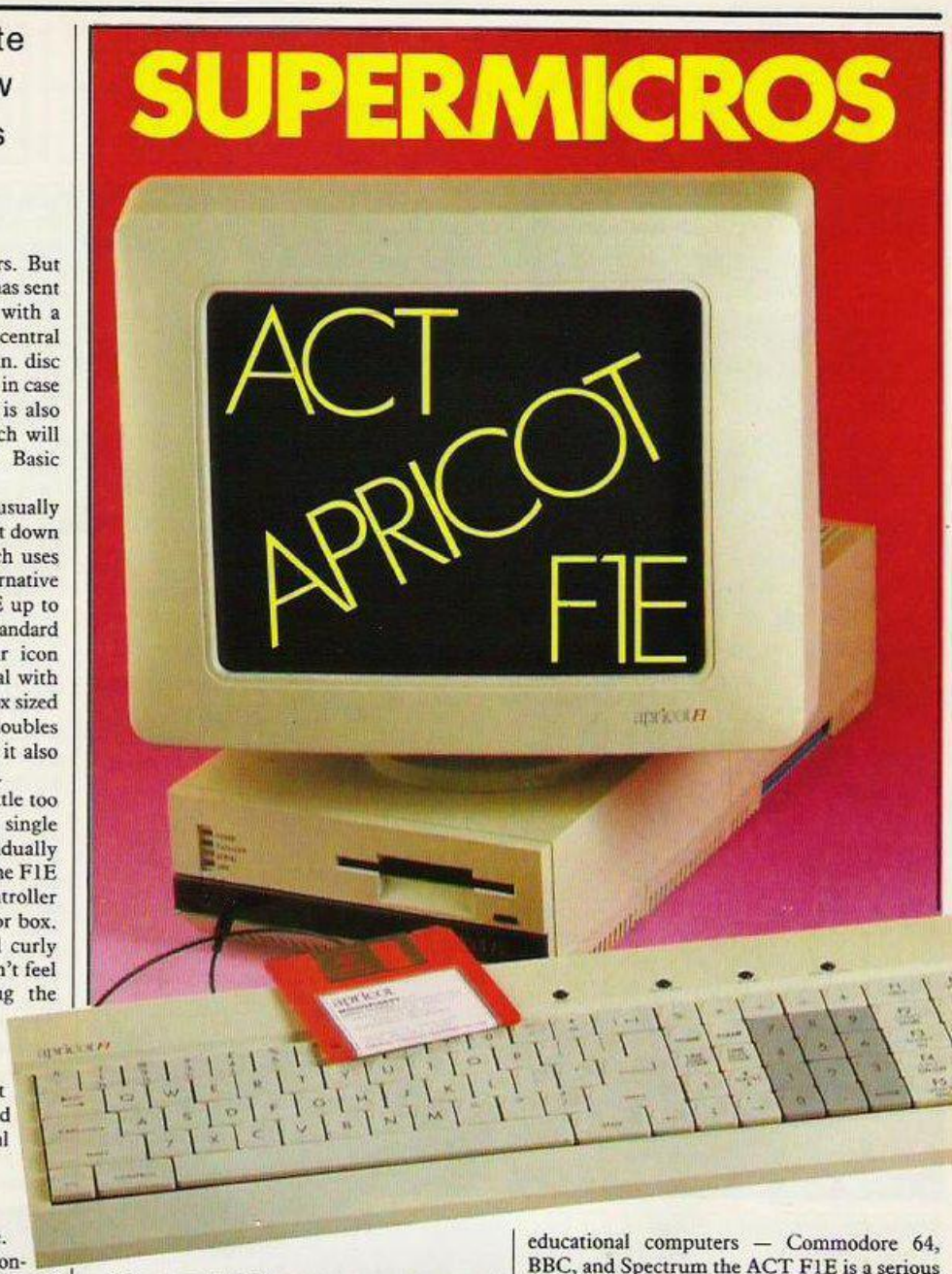
Send to: **WITS, 33 Foscote Rd., London NW4 3SE**

Enquiries: 01-430 2284

Prices include all delivery charges. Almost 25% off retail price for most items. Overseas: Add £1 per item

SUPERMICROS

Elsie Dee takes a byte or two out of the new Apricot FIE and likes what she tastes.



ACT DOES NOT MAKE home computers. But the latest price cut on the Apricot F1E has sent it storming down into BBC territory with a specification of 128K Ram, 16-bit 8086 central processor and built in 320K Sony 3.5 in. disc drive for £685 including VAT. And just in case Acorn does not get the message ACT is also launching a £30 B-Tran program which will allow the F1E to run most BBC Basic programs.

Unlike the expanded home micros usually found in this price range the F1E is a cut down version of the F1 business micro which uses a mouse and icons as a user-friendly alternative to the keyboard. You can expand the E up to F1 spec including a mouse but even in standard form the E comes with a full colour icon display. The machine looks professional with its separate keyboard and slimline shoebox sized processor unit cum disc drive which doubles up as a base for the monitor, although it also has a video output to an ordinary TV.

The battery-powered keyboard is a little too like the QL's with the keys cut from a single slice of plastic rather than individually moulded. Batteries are needed because the F1E has a "look no strings" TV-remote-controller style infra red link to the main processor box. This has the advantage over the usual curly telephone cable connection that you don't feel like an elastic band is trying to tug the keyboard out of your hands, but the disadvantage is that unless you keep it lined up with the processor you can lose keystrokes. As an afterthought to try to overcome this ACT has added a light pipe which restores the physical connection between keyboard and shoebox — unfortunately the pipe is not as well made as the rest of the machine and ours broke in normal use.

The F1E comes with ACT's own icon-driven interface called Activity. Getting started couldn't be simpler — you just switch on and feed in the demonstration disc which introduces you to icons. These are a series of diagrammatic representations along the bottom of the screen labelled Activity, Files, Utilities, Disk, Help, and Exit. You just use the cursor keys to position an on-screen arrow over your choice and then use the Enter and Return keys to call it up.

This Apricot also comes with MS-Dos the IBM PC style operating system used in most business micros — although the F1E is not IBM compatible. Also supplied on disc with the F1E is GW-Basic, Diary and Sketch programs.

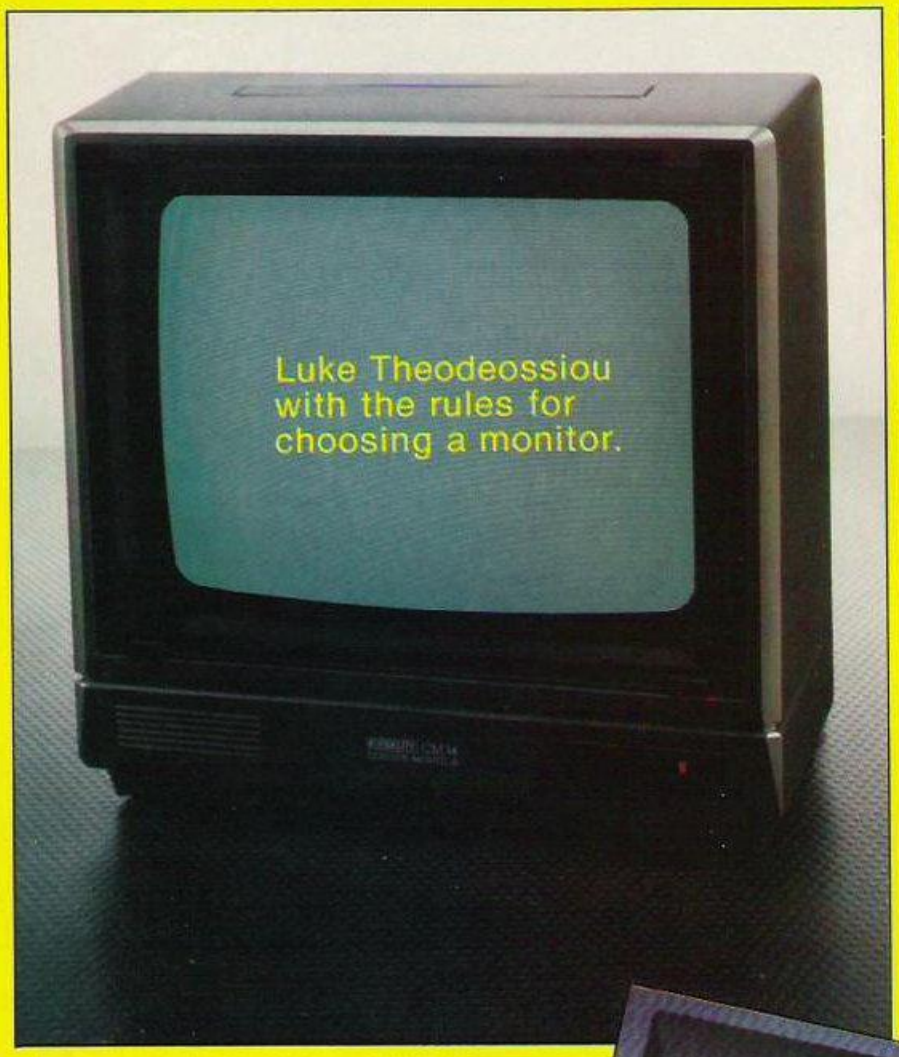
Unlike the second generation home and educational computers — Commodore 64, BBC, and Spectrum the ACT F1E is a serious 16-bit micro designed to upgrade into a full hard disc-based business system if necessary.

Unlike the QL the Apricot has a reliable built-in mass storage system and software already developed for serious use on its larger cousins in the ACT range.

Although the FIE can display four out of 16 colours in up to 640 by 256 resolution it does not pretend to be a games machine. Programs like Infocom's Hitchhikers guide to the Galaxy are available but the Apricot's strength is the range of business software which its operating system makes available to it which paradoxically may increase its chances in the educational market. Brian Androlia, managing director of ACT claims that students "need the experience of using serious industry standard software which normally will not run on 8 bit micros."

It may be next year before new generation micros like the Atari 520 ST and Commodore Amiga are on sale with the range of software the ACT already has, so for the moment the F1E wins the battle of the supermicros. ■

PICKING THE TV M



WHEN WE LOOKED at monitors — see *Your Computer* December 1984, page 84 — we made it clear that in our opinion dedicated standard resolution monitors did not provide good value for money. We therefore suggested that anyone in the market for a monitor should first of all determine the primary use the equipment is to be used for before even starting to look at what's available.

If you are currently using your domestic TV set as your VDU, then you are likely to be suffering from two main problems. The first is conflict of interests — you are interested in using your computer, whilst the rest of the family is interested in watching TV. The result — conflict! One possible solution to this is to buy a second-hand colour TV. Current prices range from around £75 to over £200. The other possibility on similar lines is to buy a new 12in. monochrome portable TV for about £55.

Neither is particularly satisfactory. A black and white TV is really quite useless for games and is just as bad — from a display quality point of view — even if all you ever do is text processing. The best advice here is — forget it. A second-hand colour set is perhaps more tempting but watch out. It's likely to be several years old and its display quality is not going to be as good as that achieved by modern sets, even if you found one which was in absolutely perfect condition.

Another mine field is making the right choice, not just what make but also which model and most important of all judging its condition. Unless you are a TV engineer you could end up wasting quite a bit of money on junk. Even if you found a good one, it's very much more likely to go wrong and repairs are expensive. All in all, the risks are just too high.

The other problem which is common to all TV sets, old and new alike, is the display quality when used in conjunction with a computer. Colours lack contrast, they are noisy, there are crawling interference patterns on the screen, etc. All this makes any serious work such as text processing or program compiling virtually impossible with eye fatigue into the bargain.

The reason for this is that the computer generates three distinct signals — Red, Green and Blue — at TTL level. These signals are the cleanest possible and are used to drive RGB monitors. In order to enable owners to use their domestic TV sets, two further stages of processing are necessary. The first is to combine the three signals, together with the synchronising signal — Sync — to produce a composite video signal. This is done for a particular broadcasting system standard — for example, most of Europe, including the UK, uses a colour encoding system known as PAL.

This signal is then passed to a modulator which converts it to a radio frequency — RF — signal which is just like the signal picked up by your TV aerial. All this additional processing very nearly wrecks the quality of the

Left: Fidelity CTM 1400 colour TV monitor. Below: Ferguson TX.

MONITOR FOR YOU

A few basic rules will help clarify any grey areas.

1. Remember, all current TV-monitors are standard resolution only. If you require higher resolution, then a dedicated medium or high resolution monitor is the only answer.
2. If you connect your computer via the aerial socket, the results will be identical to an ordinary TV. Monitor performance is only possible when using "direct" connections via the SCART socket.
3. Beware of monitor-look TVs which are not necessarily TV-monitors. This is easily checked but do make sure.
4. Before buying, check that your computer has RGB outputs, or at least a composite video output. If you have both always choose the RGB output for best results.
5. Sound can also be connected directly via the SCART socket but it's hardly worth it except for music programs or similar.
6. Although TV-monitors come in a variety of sizes, the larger sizes are best suited for use with video recorders. The optimum size for home computer applications is 14in.
7. FST (Flat Square Tube) equipped TV-monitors are becoming available but the choice is limited and prices higher. FST does have some advantages over conventional tubes as well as being more pleasing on the eye but in our opinion it's not good value for money yet.
8. Think about your future display requirements before choosing your VDU. As always the best advice is to insist on a demonstration before buying.

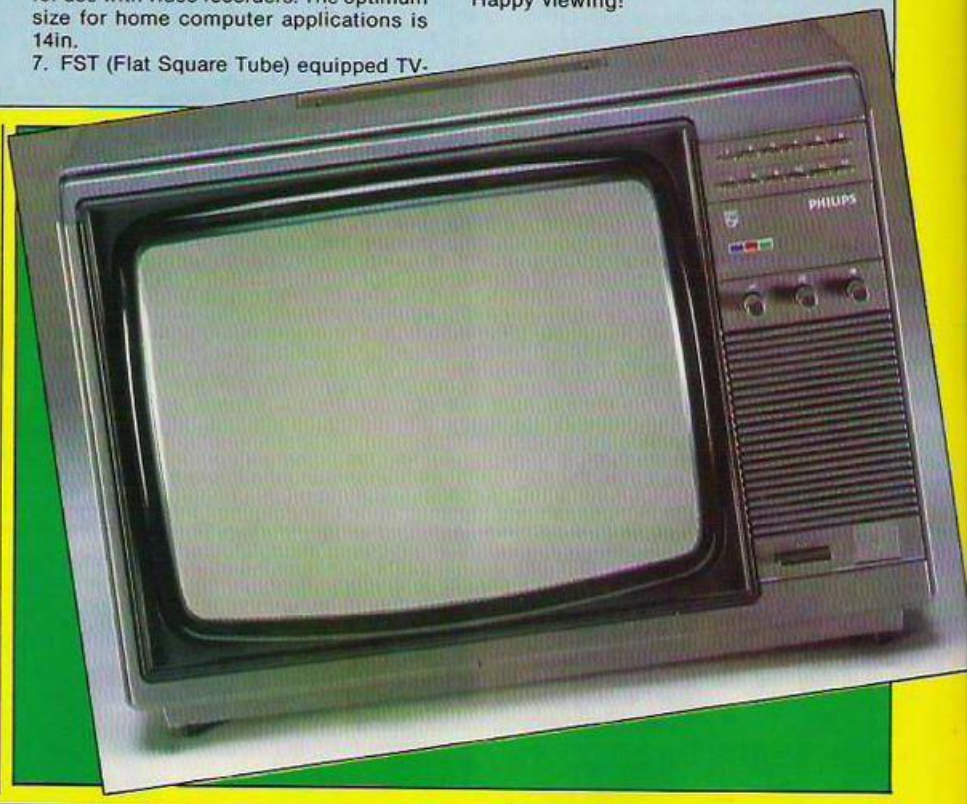
Happy viewing!

original RGB signals. The job is finished off by your TV set which has to convert the aerial signal back to separate RGB signals!

The sensible approach of course is to bypass all this encoding and decoding. This is where the TV-monitor comes in. Essentially, all it is is an ordinary TV set equipped with additional input sockets to enable direct connection from the computer to the appropriate point inside the set. Of course it's a little more complicated than that.

Amplifiers and impedance converters are used to ensure correct conditions for the signals; the TV signal has to be switched off; and the chassis has to have complete mains isolation. Although converting an existing TV for RGB operation is a theoretical possibility, the hustle, the expense and the safety risks involved make this proposition a definite non-starter.

For little more than the cost of a standard model, you get first class RGB monitor performance for your computer; a much better picture from your video recorder — by using the composite video input — and of course a TV set as well! ■



Right: Philips CT 2007 receiver monitor.

The buyers guide below is a fairly comprehensive chart of small screen TV-monitors currently available from high street retail shops. Most manufacturers also offer large screen sizes but these have been omitted from our chart. Some computer retailers have in the past offered other makes, mainly far eastern imports, but the trend now is to stay with well known brands. Shopping around may secure some savings but at best these will be very modest. Our rating system — from 1 to 10 — is a personal assessment and takes into account price, availability, ease of use, general performance, etc. It is intended as a guide only and we strongly suggest that you view before you buy.

Brand name	Model	Size	FST	R/C	Price	Connecting leads	Remarks	Rating
Ferguson	TX MC01	14in.	—	—	£229	Included	Auto source switching Recommended	8
Fidelity	CTM1400	14in.	—	—	£219	—	Good value	7
Finlux	1014RGB	14in.	—	—	£275	Optional	Pricey	4
Grundig	P40-125	36cm	Yes	—	£269.95	—	Good but pricey	5
Grundig	P40-145	36cm	Yes	Yes	£299.95	—	Good but expensive	4
Mitsubishi	CT1501BM	36cm	Yes	Yes	£299	—	Good but expensive	4
Philips	1120	9in.	Yes	—	£300	Optional	Good but expensive	3
Philips	2007	14in.	—	—	£239	Optional	DIN socket	6
Tatung	TN1441	14in.	—	—	£199	—	Very good value; recommended	8

Key: FST = Flat Square Tube
R/C = Remote control

ATARI SYSTEM *Competition* RESULTS

APRIL'S COMPETITION to win a complete Atari system attracted one of the largest entries in living memory. Probably the prize was the main draw but contestants also appeared to relish the challenge we set — to write an Atari-related limerick.

Unfortunately many entries took a broad view of what a limerick is. Thus we had odes to Atari, sonnets, rhyming couplets, 100 line verse epics, blank verse, ditties and numerous other verse forms. But, good though they were, we had to disqualify them: if it doesn't have five lines it is not a limerick.

It was also probably a mistake to end one of your lines with the word Atari. As there are only a limited number of rhymes with Atari most entries of this type tended to sound the same. They usually involved young men on safari, driving Ferraris, and sipping Camparis. One of the best of these was V. Skinner's:

A compulsive eater called Marie
Likes to nibble while drinking Campari
Between liquid sips
She's mad about chips
And gets far better bytes from Atari.

In the same line B. Axelford almost clinched it but stretched the rhymes too far:

Charles and Diana's son Harry
Was given a brand new Atari
But Prince William was mad
Cos just a Spectrum he had
So he threw the Atari At-ari.

Perhaps M. Eaton had the right idea with his succinct:

Atari Atari Atari
Atari Atari Atari
Atari Atari
Atari Atari
Atari Atari Atari

J. Outram likewise came up with something different:

A computer fanatic from Rhodes
Wrote a program for making up odes
The Atari possessed him
But his Spectrum outguessed him

By producing last lines much longer than any of the others and with no apparent rhyme.

Among the other contenders were a number of highly competent entries from abroad. In fact E. Teler's from Jerusalem was one of the few which caught the true spirit of Edward Lear:

A man known to me and to you
Runs Atari (ran Commodore too)
He thinks it is nice
To fight elephants with mice
I think he should open a zoo.

D. Williams' limerick also struck the right nonsensical note although it goes astray in the last line:

Listen to Jumping Jack Tramm
He's cutting the prices like ham
His methods are sound
XLs for the pound
You get more for your Pacs from this man.

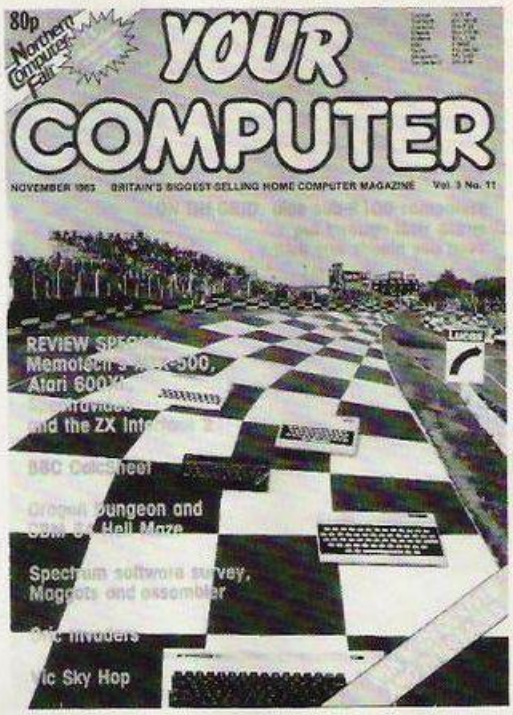
All these were in the running but after much deliberation we awarded the prize to Marie McNally, 8 Raglan Gardens, Caversham, Reading, Berkshire, for:

Mixing up Singapore and Djakarta
Jack Tramiel would call corrupt data
But it's nothing so sinister
Just the lady Prime Minister
We should swap for an Atari — it's smarter.

The mix up referred to was made by Mrs. T. on her recent visit to the Far East.

REPRINTS

a ready made sales aid



If you are interested in a particular article or advertisement in this publication why not take advantage of our reprint service. We offer an excellent, reasonably priced service. For further details and a quotation.

RING KAYE JONES ON 01 661 3799

ATARI 600XL ENTERTAINMENT PACK

Great news for games addicts who appreciate high quality graphics and sensational arcade action gameplay. For Only £69, you can buy a 16K Atari 600XL Computer with two top arcade ROM cartridge titles and a joystick. These two ROM titles are the famous arcade hit Donkey Kong and another favourite Qix (We only have a limited number of packs with Qix. When these run out, Qix may be substituted for an arcade entertainment cartridge of the same value). The 600XL Entertainment Pack offers real value for money and enables you to save £63.96, nearly half of the normal RRP's of the pack items when purchased individually. Silica Shop have a wide range of ROM cartridges available including arcade favourites such as Asteroids, Centipede, Missile Command, Popeye, Q'Bert, Star Raiders, Super Cobra for only £9.95 each! The 600XL is a programmable home computer with the Basic Programming Language built in and if you later add a 1010 Program Recorder (XLP 1010 - £34), a range of hundreds of cassette programs become available to you. The Atari 600XL is recommended as a first class games machine.

ATARI PACKS - POWER WITHOUT THE PRICE!

ATARI 600XL ENTERTAINMENT PACK

16K Atari 600XL	£99.99
Donkey Kong (R)	£14.99
Qix (R)	£9.99
Single CX40 Joystick	£7.99
Total (if purchased separately)	**£132.96**
Less Discount (approx 48.1%)	£63.96
PACKAGE PRICE (XLC 1600)	**£69.00**

£69

ATARI 800XL AND RECORDER PACK

The 64K 800XL is packaged here with the 1010 recorder, an economical storage and retrieval unit, a smash hit arcade game and programming aid, all for a package price of only £129 (ref: XLC 1010), a saving of £65.96 off the RRP's of the individual items which total £194.96. The game included in this pack is Pole Position. Now on cassette from Atari, Pole Position is an accurate reproduction of Atari's own highly successful arcade driving game which has all the thrills and spills of the grand-prix racetrack. On the reverse of this cassette is a demonstration program of Atari's amazing sound and graphics capabilities giving an example of the high quality performance of the Atari 800XL. Also included is an Invitation to Programming 1 cassette which takes you step by step through the first stages of programming in Atari Basic using Atari's unique soundthrough facility which allows pre-recorded human speech to be played through your T.V speaker. All you need is a joystick (ATJ 0400 - £7.90 for Pole Position), to be up and running with this package. The Atari 800XL in this pack comes with a Silica two year guarantee.

ATARI PACKS - POWER WITHOUT THE PRICE!

ATARI 800XL + PROG. RECORDER PACK

64K Atari 800XL	£129.99
1010 Program Recorder	£34.99
Pole Position + Demo Prog (C)	£9.99
Invitation to Programming 1	£19.99
Total (if purchased separately)	**£194.96**
Less Discount (approx 33.8%)	£65.96
PACKAGE PRICE (XLC 1010)	**£129.00**

£129

ATARI 800XL AND DISK DRIVE PACK

This pack includes the 64K 800XL with a 1050 Disk Drive for mass storage and speedy information retrieval as well as a brand new adventure game and a powerful home help program, all for only £249 (ref: XLC 1050), a saving of £115.96 off the RRP's of the individual items which total £364.96. The first of these programs is The Payoff on disk, a new adventure game which is a fantasy simulation in which you play the leading role. An exciting introduction to adventure programs which are always popular (with a demonstration program of Atari's amazing sound and graphics on the reverse). Also included in this pack is Home Filing Manager to help you organise your files. It allows you to catalogue and file details of birthdays, books, your stamp collection or anything else which would normally require you to use filing cards. The instructions for Home Filing Manager are on the reverse of the disk and all the disks which come in this package are in protective paper wallets. You get an extended two year guarantee on the 800XL and 100 free programs with the disk drive when you buy this package from Silica.

ATARI PACKS - POWER WITHOUT THE PRICE!

ATARI 800XL + DISK DRIVE PACK

64K Atari 800XL	£129.99
1050 Disk Drive	£199.99
Home Filing Manager (D)	£24.99
The Payoff + Demo Prog (D)	£9.99
Total (if purchased separately)	**£364.96**
Less Discount (approx 31.8%)	£115.96
PACKAGE PRICE (XLC 1050)	**£249.00**

£249

NEW ATARI 130XE NOW IN STOCK £169

Atari's new 128K computer, the Atari 130XE offers an enormous 131,072 bytes of RAM for only £169. The 130XE comes with built in Basic and full operating instructions and is now in a newly designed case with a modern full stroke keyboard. The XE is fully compatible with both the 400/800 and the XL ranges of machines, this means that it can run approximately 90% of all Atari Computer software on the market. This provides a range of over 1,000 software titles as well as a large selection of accessory and peripheral items. Initial stock of the 130XE will be limited, so it's first come first served.

SILICA SHOP

WE ARE THE UK'S No1 ATARI SPECIALISTS

Since the introduction of Atari Video Games into the UK six years ago, Silica Shop has been selling Atari products and supporting Atari owners with a specialist mailing service which we believe is unbeatable. We stock over 1,000 Atari related product lines and have a mailing list including over 300,000 Atari 2600 VCS owners and over 50,000 Atari Home Computer Owners. Because we specialise in Atari, we aim to keep stocks of all the available Atari hardware, software, peripherals and accessories. We also stock a wide range of Atari dedicated books and through us, the owners on our list can subscribe to several American Atari dedicated magazines. We can provide a full service to all Atari owners and are now firmly established as the UK's NUMBER ONE Atari specialists. Here are just some of the things we can offer you:

FREE POST & PACKING ON MAIL ORDERS
FREE CLUBS & INFORMATION SERVICE
HIGHLY COMPETITIVE PRICES
AFTER SALES SUPPORT SERVICE
REPAIR SERVICE ON ATARI PRODUCTS

If you would like to register on our mailing list as an Atari computer owner, or just because you are interested in buying an Atari machine, let us know. We will be pleased to keep you up to date with all new developments on the Atari scene free of charge. So, post off the coupon with your order or enquiry and begin experiencing an Atari service that is second to none.

01-309 1111

SILICA SHOP LTD, 1-4 The Mews, Hatherley Road, Sidcup, Kent, DA14 4DX Tel: 01-309 1111

ORDER NOW-OR SEND FOR OUR FREE ATARI BROCHURES

To: SILICA SHOP LTD, Dept YC 0785, 1-4 The Mews, Hatherley Road, Sidcup, Kent, DA14 4DX Telephone: 01-309 1111

LITERATURE REQUEST:

☐ Please send me your FREE brochures on Atari Home Computers.

☐ I already own a ..... Videogame ☐ I already own a ..... Computer

Mr/Mrs/Ms: ..... Initials: ..... Surname: .....

Address: .....

.....

..... Postcode: .....

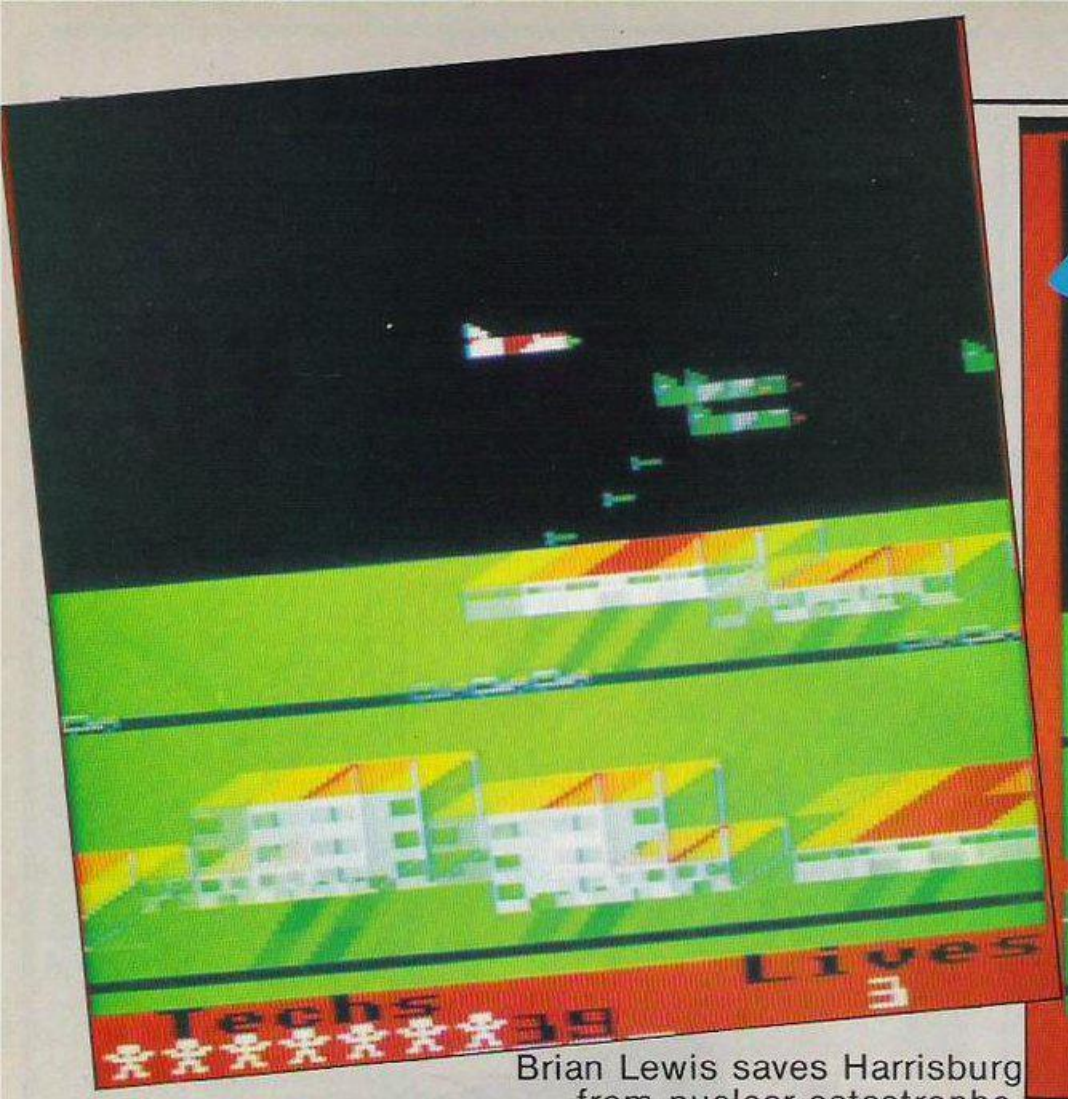
ORDER REQUEST:

PLEASE SEND ME:

☐ 16K 600XL Entertainment Pack	£69	*All prices include VAT*
☐ 64K 800XL & 1010 Recorder Pack	£129	
☐ 64K 800XL & 1050 Disk Drive Pack	£249	*Post & Packing*
☐ 128K 130XE Home Computer	£169	*is Free Of Charge*

☐ I enclose Cheque/P.O. payable to Silica Shop Limited for the following amount: £.....

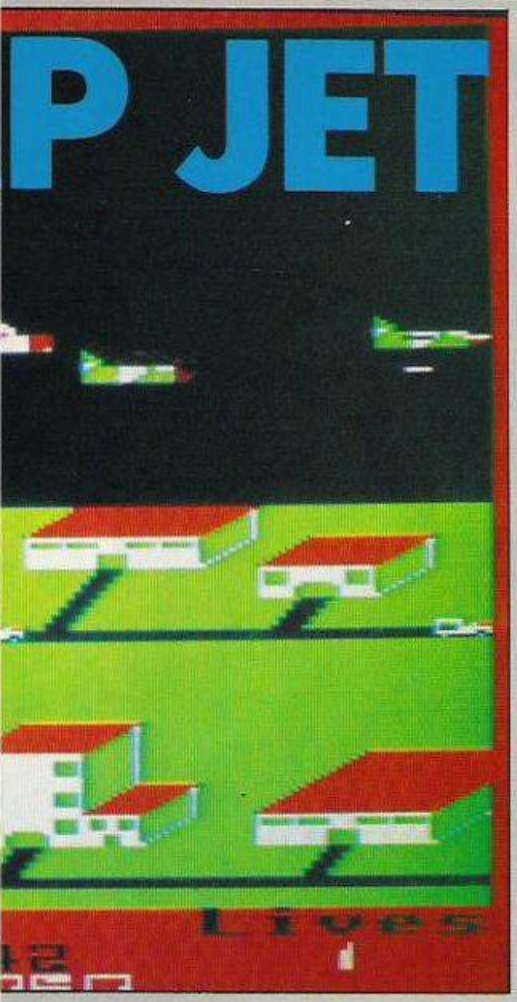
☐ CREDIT CARD - Please debit my: Access/Barclaycard/Visa/American Express/Diners Club My Card No is: .....



Brian Lewis saves Harrisburg from nuclear catastrophe.

Listing 1.

```
   0VDU23,150,28,28,107,62,8,28,20,54,23,151,36,90,16
9,149,211,179,74,52
  10DATA248,252,254,62,127,255,255,255,240,240,240,24
0,143,143,143,159,240,240,240,240,79,127,255,255,240,2
40,240,240,120,184,152,184
  20DATA240,240,240,240,240,241,242,242,241,241,241,2
42,186,115,179,241,240,240,240,248,186,217,184,240,240
,240,240,240,240,240,248,248
  30DATA240,240,240,240,225,209,145,209,240,240,240,2
40,47,239,255,255,240,240,240,240,31,31,31,159,241,243
,247,199,239,255,255,255
  40DATA&11,0,1,0,255,0,5,0
  50DATA112,40,16,220,136,0,0,0,240,240,240,240,119,1
19,119,102,240,240,240,240,187,136,0,0,240,240,240,240
,248,52,22,52
  60DATA90,37,16,156,138,8,2,10,225,210,45,240,55,39,
127,70,90,165,240,180,155,8,2,10,225,210,45,240,188,37
,30,22
  61DATA&10,0,4,0,255,0,50,0,0,0,1,0,2,0,1,0,1,0,4,0,
1,0,1,0
  62DATA240,150,195,240,240,240,195,150,240,240,240,0
,0,0,240,240,240,248,244,0,0,0,244,248,240,240,240,112
,40,112,240,240
  80DIM G% 4000:TEMP=G%:J%=TEMP+16:FORT=0TO223:READD:
T?J%=D:NEXT:for=J%+32:lef=for+32:sou=J%+96:EP=sou+8:XP
=EP+32:rad=XP+32:Wh=rad+8:Su1=Wh+8:mis=Su1+8:H%=mis+32
:FORT=0TO2STEP2:P%=H%:[OPTT
  90.setup LDA#&20:STA&70:LDA#&6C:STA&71:LDA#&10:STA&
72:LDA#&6C:STA&73:LDA#&10:STA&74:LDA#&6D:STA&75:RTS
  100.right JSRsetup
  110LDX#0:.a LDY#0:.A LDA(&70),Y:STATEMP,Y:INY:CPY#16
:BNEA
  120LDY#16:.b LDA(&70),Y:STA(&72),Y:INY:CPY#0:BNEb:
  130LDY#0:.c LDATEMP,Y:STA(&74),Y:INY:CPY#16:BNEc
  140CLC:LDA&70:ADC#&40:STA&70:LDA&71:ADC#1:STA&71
  150CLC:LDA&72:ADC#&40:STA&72:LDA&73:ADC#1:STA&73
  160CLC:LDA&74:ADC#&40:STA&74:LDA&75:ADC#1:STA&75
  170INX:CPX#12:BNEa
  180RTS
  190.left JSRsetup
  200LDX#0:.a1 LDY#0:.A1 LDA(&74),Y:STATEMP,Y:INY:CPY#
16:BNEA1
  210LDY#&FF:.b1 LDA(&72),Y:STA(&70),Y:DEY:CPY#15:BNEb
1
  220LDY#0:.c1 LDATEMP,Y:STA(&70),Y:INY:CPY#16:BNEc1
  230CLC:LDA&70:ADC#&40:STA&70:LDA&71:ADC#1:STA&71
  240CLC:LDA&72:ADC#&40:STA&72:LDA&73:ADC#1:STA&73
  250CLC:LDA&74:ADC#&40:STA&74:LDA&75:ADC#1:STA&75
  260INX:CPX#12:BNEa1
  270RTS
  280.scroll LDA#&FF:STA&970:CPX#1:BEQii:JMPleft:.ii J
MPright
  290.I% JSRreset:LDA#&58:STA&60:LDA#&6B:STA&61:LDY#0:
.A LDA#0:STA&95A,Y:INY:CPY#6:BNEA:STA&96F:STA&992:STA&
994:LDA#15:STA&94F:LDA#for MOD256:STA&62:LDA#for DIV 2
56:STA&63:LDA#63:STA&B0:LDA#95:STA&81:JSRamo
  291SEC:LDA&C2:SBC#5:STA&C2:JSRscore:LDA#0:STA&76:LDA
#5:STA&77:LDA#0:STA&78:STA&79:STA&7A
  300.start JSRprint
  310LDX#0:JSRbomb:CPX#&FF:BNEpp6:JSRtech:CPX#&FF:BNEp
p6:JMPatom:.pp6 JSRenemy:LDA&993:CMP#3:BMIkis:JSRMISIL
:.kis LDY#0
  320.Aa1 LDA(&60),Y:EOR(&62),Y:BNEbB1:CMP#240:BEQbB1:
CMP(&62),Y:BEQbB1:INY:CPY#32:BNEAa1:JMPcC1:.bB1 STX&9F
:JMPdead:.cC1
  330LDX#1:.k LDA&95A,X:AND#1:CMP#0:BEQjJS:TXA:PHA:JSR
move:PLA:TAX:.jJS INX:CPX#6:BNEk
  340LDA&970:CMP#&FF:BEQ001:JSRdelay:.001 LDA#0:STA&97
0
  350LDA&94F:CMP#1:BEQhJ:LDA#&81:LDX#&BE:LDY#&FF:JSR&F
FF4:CPY#&FF:BNEhJ:JSRrub:DEC&94F:SEC:LDA&60:SBC#&40:ST
A&60:LDA&61:SBC#1:STA&61:.hJ
  360LDA&94F:CMP#15:BEQHj:LDA#&81:LDX#&9E:LDY#&FF:JSR&
FFF4:CPY#&FF:BNEHj:JSRrub:INC&94F:CLC:LDA&60:ADC#&40:S
TA&60:LDA&61:ADC#1:STA&61:.Hj
  370LDA#&81:LDX#&9A:LDY#&FF:JSR&FFF4:CPY#&FF:BNEuI:JS
Rfire:.uI
  380LDA&81:CMP#255:BEQtS
  390LDA#&81:LDX#&98:LDY#&FF:JSR&FFF4:CPY#&FF:BNEtS:JS
RRIGHT:.tS
  400LDA#&81:LDX#&99:LDY#&FF:JSR&FFF4:CPY#&FF:BNETs:JS
RLEFT:.Ts
  410LDA&96F:BEQki:CLC:LDA&60:ADC#&40:STA&4D:LDA&61:AD
C#1:STA&4E:LDY#0:LDA(&4D),Y:CMP#240:BEQki:JMPdead:.ki
  420LDA&96F:CMP#4:BNEaa6:JSRllef:.aa6 LDA&96F:CMP#2:B
```



ASSAULT

THIS IS A scrolling game written for the Acorn Electron and BBC in which you have to defend Three Mile Island from the onslaught of enemy aircraft. To defend against the invaders you are armed with a Harrier Jump Jet which has the air-to-air missile capacity of 50. Once you have fired all your missiles, or if at any time you want to reload, you simply land your Harrier on a building similar to the one you started from.

Your actual fighting area is eight times larger than the screen. However enemy planes have a wrap-round capacity which allows them to keep flying while you have run out of air space. You lose a life if you crash into the horizon, crash into an enemy plane or get hit by one of their bombs. However, as you are defending Three Mile Island there is a greater danger than losing your three lives, the danger of a nuclear explosion. On the main screen display you will see the word "Techs" and beneath it a number of small figures, if the enemy planes drop a bomb on your fuel dump building you lose a technician; lose all your techs and the resulting nuclear blast destroys everything including your remaining three lives.

To further the difficulty of the task set for you the enemy has invented a new heat seeking missile which unlike their attack planes can travel faster than you. This missile only appears after you have killed three enemy planes without losing a life.

This is one of the few scrolling games written for the Electron — the lack of scrolling games is mainly due to the large size of the screen memory. BBC users can get over this problem by using the 6845 chip — not present in the Electron — to control full screen scrolling via registers 12 and 13. To counter this problem I have used a screen window of exactly 32 bytes wide, which enables fast and easy handling of the screen display since when displaying the contents of the window the computer does not have an X position number larger than 255 thus enabling a simply loop involving only one of the computers registers.

Pleasing screen displays

There are two listings to type in, check, save and then run. The first program is the main machine-code program containing most of the graphics, sound definitions and all the machine-code routines while the second handles setting up the screen display, keeping the score, storing the high score table etc., although quite long, the program is well worth typing in as the finished product gives some pleasing screen displays and presents a very playable game. If BBC users wish to play Jump Jet Assault then they merely have to increase the contents of the x and y registers in line 460 of program 1 to a suitable value found through experiment.

```
NEbb6:JSRrrig:.bb6
  430LDA&96F:BNEop:LDA&94F:CMP#15:BNEop:CLC:LDA&60:ADC
#&40:STA&4D:LDA&61:ADC#1:STA&4E:LDY#7:LDA(&4D),Y:CMP#1
5:BEQop:JMPdead:.op
  440JSRSEE:LDX#0:LDY#0:.Aa5 LDA&9A4,Y:BNEBb5:INX:.Bb5
 INY:INY:INY:INY:INY:CPY&99C:BNEAa5:CPX&993:BNECc5:JSR
reset:INC&993:CLC:LDA&99C:ADC#5:STA&99C:CMP#25:BNECc5:
LDA#20:STA&99C:LDA#5:STA&993:.Cc5
  441LDA&94F:CMP#15:BNEyU7:LDA&B1:CMP#80:BEQyU7:SED:CL
C:LDA&B1:ADC#1:STA&B1:CLD:JSRamo:JSRRISE:.yU7
  450JMPstart
  460.delay LDX#100:.a LDY#100:.b DEY:BNEb:DEX:BNEa:RT
S
  470.rub LDY#0:.c LDA#240:STA(&60),Y:INY:CPY#32:BNEc:
RTS
  480.fire LDA&96F:BEQend:LDA&B1:BEQend:LDX#1:.yyS LDA
&95A,X:CMP#0:BEQjS:INX:CPX#6:BNEyyS:RTS:.jS JSRSOU:SED
:SEC:LDA&B1:SBC#1:STA&B1:CLD:JSRamo
  490LDA&95A,X:ORA#1:ORA&96F:STA&95A,X:LDA#0:STA&960,X
  500LDA&96F:CMP#4:BEQLLEF:CLC:LDA&60:ADC#32:STA&950,X
:STA&4D:LDA&61:ADC#0:STA&955,X:STA&4E:JMPbulPRI:.LLEF
SEC:LDA&60:SBC#8:STA&950,X:STA&4D:LDA&61:SBC#0:STA&955
,X:STA&4E:JMPbulPRI:.end RTS
  510.move LDA&950,X:STA&4D:LDA&955,X:STA&4E:JSRBULrub
:INC&960,X:LDA&960,X:CMP#7:BPLeND
  520LDA&95A,X:AND#2:CMP#2:BEQRRIG:SEC:LDA&950,X:SBC#1
6:STA&950,X:STA&4D:LDA&955,X:SBC#0:STA&955,X:STA&4E:JM
PbulPRI:.eND LDA#0:STA&95A,X:RTS
  530.RRIG CLC:LDA&950,X:ADC#16:STA&950,X:STA&4D:LDA&9
55,X:ADC#0:STA&955,X:STA&4E:JMPbulPRI
  540.bulPRI LDA#255:.kI LDY#5:STA(&4D),Y:RTS
  550.BULrub LDA#240:JMPkI
  560.print LDY#0:.B LDA(&62),Y:STA(&60),Y:INY:CPY#32:
BNEB:RTS
  570.LEFT LDA&62:CMP#J% MOD256:BEQone:LDA&62:CMP#for
MOD256:BEQtwo:RTS
  580JMPscroll
  590.one INC&994:LDA&994:CMP#1:BNEcc6:LDA#0:STA&96F:S
TA&994:LDA#for MOD256:STA&62:LDA#for DIV256:STA&63:.cc
6 RTS
  600.two LDA#lef MOD256:STA&62:LDA#lef DIV256:STA&63:
LDA#4:STA&96F:RTS
  610.llef LDX#0:JSRprint:DEC&80:DEC&80:DEC&81:DEC&81:
JSRcustom:LDA&78:BEQjka:JSRcuuss:.jka JMPscroll
  620.RIGHT LDA&62:CMP#lef MOD256:BEQone:LDA&62:CMP#fo
r MOD256:BEQTWO:RTS
  630.rrig LDX#1:JSRprint:INC&80:INC&81:INC&992:LDA&99
2:CMP#3:BNEnn:INC&81:INC&80:LDA#0:STA&992:.nn JMPscrol
l
  640.TWO LDA#J% MOD256:STA&62:LDA#J% DIV256:STA&63:LD
A#2:STA&96F:RTS
  650.ENEPRIT
  660JSRfind:JSRplaneRUB:INC&82:JSRmove2:JSRfind
  670JMPplanp
  680.ENE LDA#&FF:STA&971:JSRin:CPX#0:BEQNDEE:JMPENEPR
IT:.NDEE LDA#0:STA&971:LDX&82:DEX:CPX&80:BNEjj:JSRfind
:JSRplaneRUB:.jj LDA&972:BNEmo:LDY&82:CPY&81:BEQloo:IN
Y:CPY&81:BEQloo
  690INY:CPY&81:BEQloo:INY:CPY&81:BEQloo:.mo INC&82:LD
A#0:STA&972:RTS
  700.loo LDA#&FF:STA&972:RTS
  710.planp LDA&78:CMP#&FF:BEQauu:LDY#0:.ua LDA(&4D),Y
:CMP#15:BEQdne:LDAEP,Y:STA(&4D),Y:INY:CPY#32:BNEua:.dn
e RTS:.auu LDY#0:.uai LDA(&4D),Y:CMP#15:BEQdne:LDAmis,
Y:STA(&4D),Y:INY:CPY#32:BNEuai:RTS
  720.find LDA#&20:STA&4D:LDA#&58:STA&4E:SEC:LDA&82:SB
C&80:TAX:LDY#0:.FG CPX#0:BEQHHS:CLC:LDA&4D:ADC#8:STA&4
D:LDA&4E:ADC#0:STA&4E:DEX:JMPFG:.HHS LDX&83:LDY#0:.gf
CPX#0:BEQhhS:CLC:LDA&4D:ADC#&40:STA&4D:LDA&4E:ADC#1:ST
A&4E:DEX:JMPgf:.hhS RTS
  730LDA&9B4:STA&82:LDA&9B5:STA&83:JSRin:CPX#&FF:BNEKk
4:DEC&82:DEC&82:JSRfind:JSRBOMrub::INC&82:INC&82:JSRfi
nd:JMPBOMpri:.Kk4 RTS
  740.planeRUB LDA&78:CMP#&FF:BNEiqw:SEC:LDA&4D:SBC#24
:STA&4D:LDA&4E:SBC#0:STA&4E:.iqw LDY#0:.UA LDA(&4D),Y:
CMP#15:BEQO1:LDA#240:STA(&4D),Y:.O1 INY:CPY#72:BNEUA:L
DA&78:CMP#&FF:BNEjo
  741CLC:LDA&4D:ADC#24:STA&4D:LDA&4E:ADC#0:STA&4E:.jo
RTS
  750.move2 LDA&78:CMP#&FF:BEQmnu:LDA&82:CLC:ADC#16:CM
P&80:BMIff6:LDX#&FF:.ff6 LDA&85:CMP#4:BEQup:INC&83:CPX
#&FF:BNEhh6:LDA&83:CMP&94F:BNEhh6:DEC&83:.hh6 LDA&83:C
MP#12:BEQrev:RTS:.up DEC&83:CPX#&FF:BNEjj6:LDA&83:CMP&
94F:BNEjj6:INC&83
  751.jj6 LDA&83:CMP#6:BEQrev:RTS
```

(continued on page 55)

·JONAH· ·BARRINGTON'S·

SQUASH

FEATURING *Reprosound*

All the speed and excitement of championship squash is now available at your fingertips in a game so realistic – you'll need a shower afterwards!

Written with the help of Jonah Barrington, former World Squash Champion, the game keeps to the International Squash Racquet Federation rules as far as is possible. You serve in a 3D glass-backed court to play against your computer, or, using the game's two player option you can challenge a friend.

There are 4 levels of difficulty, and depending how fit you are you can play 1, 3 or 5 game matches! Check your score with the on screen display, but as your eyes are too busy watching the ball, Jonah Barrington acting as marker calls out the score for you. All this is due to a programming breakthrough that enables your computer to accurately reproduce the human voice without any hardware add-ons!

The game also incorporates a User Defined Joystick/Keys option which means that you can set your keyboard to suit you, or play with just about any make of joystick.

So get in training for this high- powered action game now.

It's your service next!

FOR

Commodore 64
and all
48K Spectrums
£7.95

New Generation Software

GSH

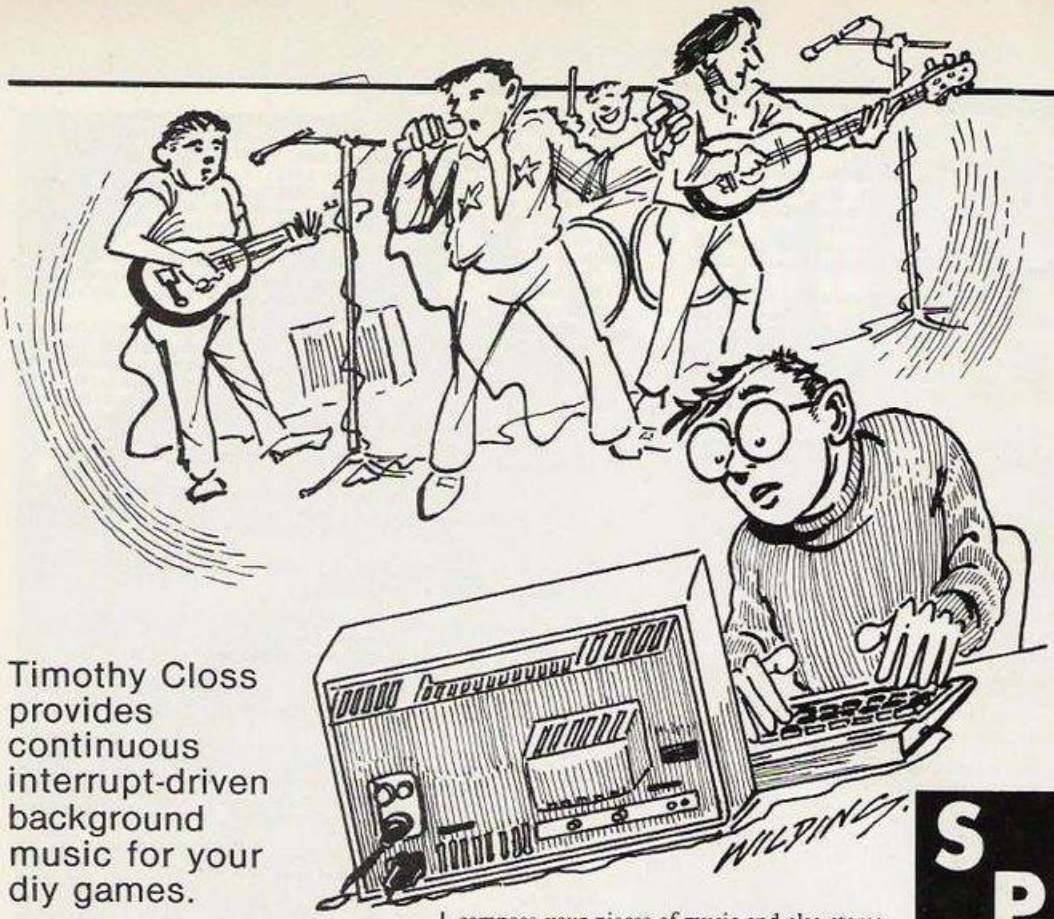
FREEPOST, Bath BA2 4TD. Tel: 0225 316924

New Generation products are sold according to their terms of trade and conditions of sale.

(continued from page 53)

```
760.rev LDA&85:EOR#12:STA&B5:RTS
761.mnu LDA&7A:EOR#1:STA&7A:LDA&7A:CMP#0:BEQsik:LDA&
83:CMP&94F:BMlpu:DEC&83:RTS:.pu INC&83:.sik RTS
780.SOU PHA:TYA:PHA:TXA:PHA:LDA#7:LDX#sou MOD256:LDY
#sou DIV256:JSR&FFF1:PLA:TAX:PLA:TAY:PLA:RTS
790.dead LDA#&10:STAsou:LDA#2:STAsou+4:STAsou+6:JSRS
OU:LDA#&11:STAsou:LDA#255:STAsou+4:LDA#5:STAsou+6:JSRM
ISIL
800LDA&94F:CMP#15:BEQdD1:LDA&96F:CMP#2:BNEeE1:JSRrri
g.:eE1 LDA&96F:CMP#4:BNEl16:JSRllef:.l16 JSRrub:CLC:LD
A&60:ADC#&40:STA&60:LDA&61:ADC#1:STA&61:INC&94F:JSRpri
nt:JSRdelay:JMPdead:.dD1 RTS
810.custom LDY#0:.Bb4 LDA&9A4,Y:BEQbb4:LDA&9A0,Y:STA
&82:LDA&9A1,Y:STA&83:TYA:PHA:JSRin:CPX#0:BEQAn:JSRCUST
OM:.An PLA:TAY:LDA&82:STA&9A0,Y:LDA&83:STA&9A1,Y:.bb4
INY:INY:INY:INY:INY:CPY&99C:BNEBb4
820LDA&9B4:STA&82:LDA&9B5:STA&83:DEC&82:DEC&82:JSRin
:CPX#&FF:BNEL14:JSRfind:JSRBOMrub:INC&82:INC&82:JSRfin
d:JMPBOMpri:.L14 RTS
830.in LDX&00:INX:CPX&82:BPLnde:LDX&0:INX:CPX&82:BM
Inde:LDX#&FF:RTS:.nde LDX#0:RTS
840.enemy LDY#0:.Aa4 LDA&9A4,Y:BEQaa4:LDA&9A0,Y:STA&
82:LDA&9A1,Y:STA&83:LDA&9A2,Y:STA&85:LDA&9A3,Y:STA&972
:TYA:PHA:JSRENE:PLA:TAY:LDA&82:STA&9A0,Y:LDA&83:STA&9A
1,Y:LDA&85:STA&9A2,Y:LDA&972:STA&9A3,Y:.aa4 INY:INY:IN
Y:INY:INY:CPY&99C:BNEAa4
850RTS
860.CUSTOM DEC&82:DEC&82:JSRfind:JSRplaneRUB:INC&82:
INC&82:JSRfind:JMPplanp
870.reset LDA#0:STA&9A0:STA&9A3:STA&9AB:STA&9AD:STA&
9B2:LDA#13:STA&9A1:LDA#4:STA&9A2:LDA#10:STA&9A5:LDA#8:
STA&9A6:LDA#8:STA&9A7:LDA#1:STA&9A4:STA&9A9:STA&9AE:ST
A&9B3:LDA#15:STA&9AA:LDA#6:STA&9AB:LDA#8:STA&9AC
880LDA#20:STA&9AF:LDA#2:STA&9B0:LDA#8:STA&9B1:LDA#1:
STA&9B4:LDA#14:STA&9B5:LDA#0:STA&9B6:RTS
890.SEE LDY#0:.Cc4 LDA&9A4,Y:BEQcc4:LDA&9A0,Y:STA&82
:LDA&9A1,Y:STA&83:TYA:PHA:JSRsee:PLA:TAY:.cc4 I
NY:INY:INY:INY:INY:CPY&99C:BNECc4:RTS
900.see JSRin:CPX#&FF:BNEDd4:JSRfind:LDY#0:.Ee4 LDA (
&4D),Y:CMP#&FF:BEQhit:INY:CPY#32:BNEEe4:.Dd4 RTS:.hit
LDA#0:LDY&7F:STA&9A4,Y:JSRdiv:JMPscore
910.bomb LDA&9B4:STA&82:LDA&9B5:STA&83:JSRin:CPX#&FF
:BNEGg4:JSRfind:JSRBOMrub:LDA&83:CMP#15:BEQHh4:INC&83:
JSRfind:JSRBOMpri:LDA&82:STA&9B4:LDA&83:STA&9B5:.Jj4 R
TS:.Gg4 LDX&82:CPX&00:BEQnnn6:LDX&82:DEX:CPX&00:BNEnn6
TS:.nnn6 JSRfind:JSRBOMrub
911.nn6 LDA&9B5:CMP#15:BEQHh4:INC&9B5:RTS
920.Hh4 INC&83:JSRin:CPX#&FF:BNEOo6:JSRfind:LDY#5:LDA
(&4D),Y:BEQoo6:LDX#&FF:STX&9F:LDY#0:JMPddd:.o6 LDY#0:ST
Y&9F:.dd6 LDA&9A4,Y:BNEee6:INY:INY:INY:INY:CPY&99C
:BNEdd6:.ee6 LDA&9A0,Y:TAX:INX:INX:STX&9B4:LDA&9A1,Y:T
AX:INY:STX&9B5:LDX&9F:RTS
930.BOMrub LDY#0:.dd4 LDA (&4D),Y:CMP#15:BEQee4:LDA#2
40:STA(&4D),Y:.ee4 INY:CPY#32:BNEdd4:RTS:.BOMpri LDY#4
:LDA(&4D),Y:CMP#15:BEQli4:LDA#248:STA(&4D),Y:INY:LDA#0
:LDA(&4D),Y:INY:LDA#248:STA(&4D),Y:.li4 RTS
940.dive JSRfind:JSRPlanp:JSRdelay:JSRPLAP:JSRdelay:JMP
:INC&82:JSRfind:JSRplanp:JSRdelay:JSRPLAP:JSRdelay:JMP
dive:.Nn4 LDA&9B4:STA&82:LDA&9B5:STA&83:JSRin:CPX#&FF:
BNEkk6:JSRfind:JSRBOMrub:.kk6 RTS
950.PLAR LDY#0:.Oo4 LDA (&4D),Y:CMP#15:BEQPp4:LDA#240
:STA(&4D),Y:INY:CPY#40:BNEOo4:.Pp4 RTS:.PLAP LDY#0:.Qq
4 LDA (&4D),Y:CMP#15:BEQPp4:LDAXP,Y:STA(&4D),Y:INY:CPY#
32:BNEQq4:RTS
951.atom LDA#17:JSR&FFEE:LDA#1:JSR&FFEE:LDA#7:LDX#ra
d MOD256:LDY#rad DIV256:JSR&FFF1:LDA#28:JSR&FFEE:LDA#2
:JSR&FFEE:LDA#15:JSR&FFEE:LDA#17:JSR&FFEE:LDA#1:JSR&FF
EE:LDA#17:JSR&FFEE:LDA#13:JSR&FFEE:LDA#9:JSRpmus:LDX#3:LDY
952LDX#6:LDY#5:JSRpmus:LDX#4:LDY#9:JSRpmus:L
#11:JSRpmus:LDX#3:LDY#11:JSRpmus:LDX#4:LDY#9:JSRpmus:L
DX#6:LDY#5:JSRpmus
953LDA#8:STA&9F:.We7 LDX#7:LDY#3:JSRpmus:DEC&9F:LDA&
9F:BNEWe7:LDA#26:JMP&FFEE:RTS
954.tech LDA#17:JSR&FFEE:LDA#129:JSR&FFEE:LDA#31:JSR
&FFEE:LDX&00:INX:INX:TAX:JSR&FFEE:LDA#30:JSR&FFEE:LDA#
32:JSR&FFEE:JSRamoc DEC&B0:LDA&B0:CMP#&FF:BNEEr7:LDX#&F
F:RTS:.Er7 LDX#01:RTS
955.R% LDA#32:STA&9F:.Rt7 JSRleft:DEC&9F:LDA&9F:BNER
t7:LDA#32:STA&9F:.As7 JSRright:DEC&9F:LDA&9F:BNEAs7:RT
S
956.amo LDA#17:JSR&FFEE:LDA#2:JSR&FFEE:LDA#31:JSR&FF
EE:LDA#9:JSR&FFEE:LDA#30:JSR&FFEE:CLC:LDA&B1:LSRA:LSRA
:LSRA:LSRA:CLC:ADC#128:JSR&FFEE:LDA&B1:AND#15:CLC:ADC#
128:JMP&FFEE
957.score CLC:LDA&C2:ADC#5:STA&C2:CMP#10:BNEshow:LDA
#0:STA&C2:INC&C1:LDA&C1:CMP#10:BNEshow:LDA#0:STA&C1:IN
C&C0
958.show LDA#17:JSR&FFEE:LDA#3:JSR&FFEE:LDA#31:JSR&F
FEE:LDA#8:JSR&FFEE:LDA#31:JSR&FFEE:LDY#0:.ui7 CLC:LDA&
C0,Y:ADC#128:JSR&FFEE:TXA:JSR&FFEE:LDA#14:JSR&FFEE
959.pmus LDA#31:JSR&FFEE:TXA:JSR&FFEE:LDA#10:JMP
E:LDA#151:.Gw7 JSR&FFEE:DEY:BNEGw7:JSRdelay:LDA#10:JMP
&FFEE
960.RISE LDA#7:LDX#WH MOD256:LDY#WH DIV256:JSR&FFF1:
LDA&B1:STASu1+4:LDA#7:LDX#Su1 MOD256:LDY#Su1 DIV256:JM
P&FFF1
961.MISIL LDA#&FF:STA&7B:LDA&76:STA&82:LDA&77:STA&83
:LDA&79:STA&972:JSRENE:LDA&82:STA&76:LDA&83:STA&77:LDA
&972:STA&79:LDA#&78:INC&76:RTS
962.cuuss LDA#&FF:STA&7B:LDA&76:STA&82:LDA&77:STA&83
:JSRin:CPX#&FF:BNEgt:JSRfind:JSRCUSTOM:LDA&82:STA&76:
LDA&83:STA&77:.gt LDA#0:STA&78:RTS
969]:NEXT
970?&906=13:CHAIN"
```

```
0=FX13,5
9VDU23,141,255,255,255,0,0,0,0
10FX4,1
20GOSUB2000
30ENVELOPE1,1,-1,-12,1,1,20,10,126,0,0,-126,126,126
40IMODE4:ON ERROR GOTO170:MODE(TI?0):HS$(T)="vin
ce"
50VDU23;8202;0;0;0;0;:PROCHS(T):IF HS$(T)=""THEN
FORT=0TO3:T?&C0=B:NEXT:?&99C=5:ilvee=3:COLOUR1
30:CLS:GOSUB800:COLOUR129:CLS:PROCN
50VDU23,131,0,0,112,112,112,112,0,0,23,132,0,0,14,1
4,14,0,0
60VDU23,133,0,0,112,112,112,115,7,7,7,23,134,0,14,14
,14,20,224,224,224
70VDU23,135,0,0,102,102,102,0,24,24,24
80VDU23,136,1,3,7,15,31,63,63,63
90VDU23,137,255,254,248,248,224,192,128
100VDU23,138,1,2,4,0,16,32,64,128,23,139,1,1,1,1,1,1
,1,23,140,0,1,1,1,1,1,1
110VDU23,142,0,0,0,248,140,159,253,66
120VDU23,143,8,8,8,0,0,0,0,23,152,198,133,197,133,
198,56,48,48,23,153,196,132,135,5,07,08,08,112
150VDU28,2,15,17,17,17,20,24,20,2,28,17,16,17,120
,17,26
160VDU23,128,0,123,123,0,0,0,0,23,129,0,195,195,0,
60,60,60,60,23,130,0,222,222,0,0,0,0
170COLOUR0:COLOUR131:VDU31,0,17,129,129,130
180VDU31,1,12,129,129,130
190VDU31,1,12,18,133,134
200VDU31,1,3,23,131,132,31,3,24,131,132,31,3,25,133,13
4
210VDU31,7,24,131,132,31,7,25,131,132,31,7,26,133,13
4
220VDU31,2,25,128,129,26,135
230COLOUR129:VDU31,7,16,32,32
240VDU31,13,17,32
250VDU31,4,23,32
260VDU31,4,24,32,32,31,13,25,32,32
280COLOUR130:COLOUR1:VDU31,0,16,136,31,11,16,137
290VDU31,12,17,136,31,14,17,137
300VDU31,2,22,138,31,5,23,139
310VDU31,7,23,136,31,9,23,137
320VDU31,11,23,136,31,12,23,137,156
330VDU31,16,24,137,31,15,25,137
340VDU31,2,24,138,31,5,25,139,137
350COLOUR3:VDU31,11,17,138
360VDU31,14,18,138
370VDU31,5,25,138,31,5,24,139,31,5,23,139
380VDU31,10,26,138
390VDU31,15,26,138,31,16,25,138
400VDU31,9,24,139
410COLOUR0:PRINTTAB(2,20);STRING$(16,CHR$141);TAB(2,
20);STRING$(16,CHR$141);
420VDU5,10,8,3:MODE784,31:VDU140
430MOVE96,479:VDU140
440MOVE320,319:VDU140
450MOVE576,207:VDU140
460MOVE640,223:VDU140
470MOVE1024,254:VDU140
480GCOL0,3:MOVE440,403:VDU142:GCOL0,1:MOVE440,403:VD
U143
490GCOL0,3:MOVE940,403:VDU142:GCOL0,1:MOVE940,403:VD
U143
500VDU4
510GCOL0,2:X%=594:FORT%=44TO383 STEP-4
520MOVEX%,TI:DRAWX%+16,TI:X%=X%-4:NEXT
530X%=816:FORTI%=41TO383 STEP-4
540MOVEX%,TI:DRAWX%+24,TI:X%=X%-4:NEXT
550X%=240:FORTI%=19TO127 STEP-4
560MOVEX%,TI:DRAWX%+24,TI:X%=X%-4:NEXT
570X%=580:FORTI%=19TO127 STEP-4
580MOVEX%,TI:DRAWX%+24,TI:X%=X%-4:NEXT
590X%=852:FORTI%=19TO127 STEP-4:MOVEX%,TI:DRAWX%+16,
TI:X%=X%-4:NEXT
590VDU23,128,0,254,130,130,130,134,134,134,254,23,129,0,
4,4,12,12,12,12,12,12
592VDU23,130,0,240,136,0,240,128,152,240,23,131,0,12
0,0,0,124,12,12,124
593VDU23,132,0,240,136,136,232,252,0,0,23,133,0,252,
109,128,252,128,140,252
594VDU23,134,0,248,136,128,240,136,152,248,23,135,0,
248,136,0,248,24,24,24
595VDU23,136,0,124,68,68,254,199,199,254,23,137,0,25
2,199,199,254,4,132,252
600ENVELOPE1,0,0,0,0,0,0,0,0:IF ilvee>3 THEN 610 ELSE:COLOUR131:
COLOUR0:PRINTTAB(12,18);"Jump Jet Assault":CALLR:FORT=
0TO100:NEXT:PRINTTAB(2,18)SPC16
610VDU4,17,3,17,128,30
620COLOUR0:FORI=1,-1,-2,3,1,2,100,0,0,0,0,0
630FORI=64:A=CHR$(ilvee+128)
640COLOUR129:PRINTTAB(2,30);STRING$(?&80,CHR$150):TA
B(15,30);A$:COLOUR2:PRINTTAB(3,29);"Teche"TAB(13,29);"
Lives"CLL(ilvee+1)ilvee=0 OR ?&80=0 THEN 650
660NEXT:FORT=0TO3:A$=A$+STR$(?&C0):NEXT:SC=VALA$
670X=715,5
680IF ?&80<255 THEN 778
690VDU19,3,0;0;19,1,0;0;
700=FX12,2
710=FX10,2
720FORT=0TO50:SOUND1,4,T?(T),1:NEXT:SOUND&,-15,
4,5:COLOUR131:CLS:FORS=0TO98:NEXT:COLOUR130:CLS:VDU19,
3,7;19,1,7;19,
730A$=0:Status Report":A$=RND(6):A$(1)="Dead...":
STR$A$+"000.000":A$=RND(4):A$(2)="Wounded...":"STR$A$
"00.000":A$(3)="Cause...:Melt Down":A$(4)="Island ...
DESTROYED"
740COL=0:FORT=0TO4:LX=LEN$(T):X%=(20-LX)/2:XS=X%-1
TOFT=TOLEN$(T):COLOUR130:COLOURcol:PRINTTAB(XS+TX,
3+(T*3));MID$(A$(T),TX,1);:COLOUR0:COLOUR129:COLOUR3:col=col+1:
1,1,1,1:ENDPROC:NEXT,:COLOUR130:VDU8,32:col=col+1:
F col=2 col=3
750PROCG2:1=NEXT
760COLOUR1:PRINTTAB(2,4)STRING$(15,CHR$141);FORD=0
TO500:NEXT
770VDU19,3,7;0;
780=FX15,5
790COLOUR130:CLS:PROCHS(gh):GOTO41
800COLOUR3:PRINTTAB(0,29);"PRESS THE SPACE BAR"
810A$=STR$A$+CHR$(ilvee+48):"Play. Jump Jet Assault'.....
.....it.you.dare.....you.the.fastest.
urvive.....a game.of.courage.stamina.....and.skill.....Ju
MP JET ASSAULT.a.game.for.the.nuclear.age....where.a.si
state.could.destroy.millions.
820COLOUR1:PRINTTAB(2,3);"JUMP JET ASSAULT":COLOUR0:
PRINTTAB(1,4)STRING$(18,CHR$141);
830COLOUR1:PRINTTAB(2,7)"A game of skill and determin
ation":COLOUR1:PRINTTAB(1,20)"WRITTEN BY B LEWIS"
840=FX15,0
850COLOUR0
860T3=1
870FORTTAB(0,15):MID$(A$,TX,20)
880FORI=1:MX=X(T):IF I=T-1 THEN 900
890MY=Y(T):IF T=LEN$ TX=1:GOTO 870 ELSE GOTO970
900=FX21,5
910PROCDRAW(MX,MY):NEXTFORTI=TO5:SOUND1,1,TX+51,2:NEXT
:RETURN
920DEF PROCHS(gh)T=1
930IF SC>HS(T) THEN 960
940T=T+1:IF T<4 THEN 930
950GOTO1000
960IF T=5 THEN 990
970FORS=SIGT STEP-1:HS(GX)=HS(GX-1):HS$(GX)=HS$(GX-
1):NEXT
980HS(T)=SC:PROCname:HS$(T)=A$
990A=15-LEN$(T):HS$(T)=HS$(T)+STRING$(A,".")+CLS
1000COLOUR0:PRINTTAB(1,3);STRING$(18,CHR$141);:COLOUR
1:PRINTTAB(2,2)"High Score Table"
1010FORTX=1TO5:IF HS(TX)<950 THEN X=1 ELSE X=0
1020IF TX=T THEN COLOUR3 ELSE COLOUR1
1030PRINTTAB(7,(TX*2)+4);HS$(TX);:COLOUR0:PRINTTAB(15+
X,(TX*2)+4);HS(TX):NEXT
1040COLOUR3:PRINTTAB(0,29);"PRESS THE SPACE BAR":REP
EAT:UNTILINKEY-99:CLS:FORTX=1TO5:SOUND1,4,100-TX*3,1:N
EXT:ENDPROC
1050DEFPROCname:COLOUR0:COLOUR130:PRINTTAB(3,3)STRIN
G$(4,"-");:EX=8:DX=11:LX=8:CX=&5:XX=8:YS=7
1060COLOUR3:PRINTTAB(1,22);"ENTER IN YOUR NAME":COLOU
R1:PRINTTAB(2,24);"USING FIRE:CLOSE:PRINTTAB(3,26);"
LEFT AND RIGHT"TAB(2,4)(STRING$(16,CHR$141));:COLOUR3:
PRINTTAB(5,31)"Good Play!"
1070PRINTTAB(0,7);"A B C D E F G H I J"TAB(0,9);"K L
M N O P Q R S T"TAB(0,11);"U V W X Y Z . / "CHR$13;
:ENDPROC
1080COLOUR0:COLOUR131:VDU31,XX,YS,CX
1090REPEAT:A$=GET:IF A$=" " PROCleft
1100IF A$=" " PROCright
1110IF A$=" " PROCfire
1120IF EX=1 THEN 1240
1130GOTO1080
1140DEFPROCleft:COLOUR130:COLOUR3:VDU31,XX,YS,CX:XX=
X-2:IF XX<=2 YS=YS-2:XS=10:IF YS<1
1150VDU31,4,2:VDU31,XX,YS:AX=135:blo=USR(&FFF4)
:CX=blo?1:ENDPROC
1160DEFPROCright:COLOUR130:COLOUR3:VDU31,XX,YS,CX:XX=
XX+2:IF XX>20 YS=YS+2:XS=0:IF YS>13 YS=7
1170GOTO1150
1180DEFPROCfire:IF CX=152 OR CX=153 THEN 1220
1190IF LX=14 ENDPROC
1200VDU31,1,255,5:COLOUR130:COLOUR1:VDU31,LX+3,3,C
X:LX=LX+1
1210ENDPROC
1220SOUND&11,1,255,5:IF CX=152 EX=1:ENDPROC
1230IF LX=8 ENDPROC ELSE COLOUR1:COLOUR0:VDU31,LX+5,1:PR
INTTAB(LX+3,3);"-":ENDPROC
1240COLOUR130:COLOUR1:A$="":FORT=0TO.5:+1
1250VDU31,TX+3,3:blo=USR(&FFF4):A$=A$+CHR$(blo?1):NE
XT:ENDPROC
1260ENDPROC
1280MODE4:VDU23;8202;0;0;0;:PRINTTAB(10,5)"Instructi
ons ?"
2010A$=GET$:IF A$="Y" AND A$="N" THEN 2010
2020IF A$="N" THEN RETURN
2030CLS:PRINTTAB(12,3);"Jump Jet Assault"TAB(11,4)ST
RING$(18,CHR$141)
2040PRINT"You are the soul defender of the nuclearpla
nt on three mile island.The SOVIETS realise that you
are the weak link in the WESTERN defence and
so set about attacking the plant."
2050PRINT"Your only form of defence is the HARRIERvo
u are sitting in.This can carry fifty bullets which wi
ll destroy any aircraft you might encounter.T
o reload simply land on a building similar to
you started from."
2060PRINT"If the enemy drop a bomb on the atore- men
tioned buildings you loses technicianlose all your TE
CHS and its goodbye. You also die if the enemy
bomb you.Once there are three or more"
2061PRINT"enemy planes a missile will be launched wh
ch cannot be destroyed only dodged. This missile trav
els at twice the speed of the other planes and
cannot catch it"
2070PRINT"The controls are:-"
2080PRINTTAB(3);"A - UP,Z - DOWN,< - RIGHT,> - LEFT-
2090PRINT"TAB(18);"M - FIRE";
2100PRINT'"TAB(10);"PRESS SPACE FOR GAME";
2110REPEAT:UNTILINKEY-99:RETURN
2111DEFPROCclik
2112RM.1
2113FORG=BTO50:NEXT
2114RM.0
2115ENDPROC
2120DEMPY
```



BACKBOOGIE

SPECTRUM

Timothy Closs provides continuous interrupt-driven background music for your diy games.

HOW MANY times have you wished you could boost your games programs with some background music as in Manic Miner, Automania and Gilligan's Gold? Well, now your wish has been granted with Backboogie!

Backboogie will repeatedly play a piece of music, short or long, without interfering with the running of your own programs!

The program itself is 100 per cent machine-code and uses the Spectrum's interrupt system to run it. As a lengthy discussion about the system is not needed here, I will just say that the Spectrum can be made to run a machine-code program stored at a certain memory address every 1/50th second — this process is known as an "interrupt".

The Basic program in listing 1 helps you compose your pieces of music and also stores some necessary data in the memory.

Let me explain how the program works. The music you compose is stored as a series of numbers, each representing one note, i.e.:

0 for C
1 for C#
2 for D, etc.

The Spectrum's own program for converting these numbers into values the Sound Generation Rom Routine can accept is too slow, so I have developed a faster routine using the data stored by the Basic program.

Having calculated these values, Backboogie calls the Sound Generation Rom Routine to produce a short musical sound before returning to your game.

Listing 1.

```
   1 LOAD ""CODE
   2 REM ***BACKBOOGIE***
   3 REM *******BY*******
   4 REM ****TIM*CLOSS***
   5 CLS
  10 GO SUB 1000
 500 LET G=60672
 505 RESTORE 2000: FOR H=1 TO 21
: READ K$: PRINT AT H,0;K$;AT H,30;K$: NEXT H
 510 LET A=2: LET B=21
 512 PRINT AT B,A; PAPER 0;" "
 513 IF INKEY$="7" AND B>1 THEN LET B=B-1
```

(continued opposite)

(listing 1 continued)

```
 515 IF INKEY$="6" AND B<21 THEN
 PRINT AT B,A; PAPER 7;" ": LET
B=B+1
 516 IF INKEY$="1" AND A>2 THEN
LET G=G-8: LET A=A-1
 520 IF INKEY$="0" THEN GO TO 53
5
 525 IF INKEY$="E" THEN GO TO 56
0
 530 GO TO 512
 535 FOR H=G TO G+7: POKE H,22-B
: NEXT H: LET G=G+8
 540 LET A=A+1: IF A=30 THEN LET
 H=USR 60148: LET A=29
 545 FOR J=21 TO B STEP -1: PRIN
T AT J,A; PAPER 0;" ": NEXT J
 550 GO TO 512
 560 LET O=G-60672-2: POKE 60250
,INT (O/256): POKE 60267,O-((INT
 (O/256))*256)
 570 STOP
1000 RESTORE 3000
1010 FOR H=0 TO 20
1020 READ J: POKE 60416+H*4,0: P
OKE 60417+H*4,(J/96)
1030 LET K=437500/J-30.125: POKE
 60418+H*4,INT (K/256): POKE 604
19+H*4,K-((INT (K/256))*256)
1040 NEXT H
1050 RETURN
2000 DATA "G#","G","F#","F","E",
"D#","D","C#","C","B","A#","A","
G#","G","F#","F","E","D#","D","C
#","C"
3000 DATA 261.63,277.18,293.66,3
11.13,329.63,349.23,369.99,392,4
15.3,440,466.16,493.88,523.25,55
4.36,587.32,622.24,659.24,698.44
,739.97,783.97,830.58,879.97
```

The game then continues running until, 1/50th second later, it is necessary to produce another musical sound of the same frequency as before. When a series of short sounds is heard in quick succession like this they give the impression of a continuous musical note.

The composer allows any note within a range from middle C up to 20 semitones above to be entered. Use keys 6 and 7 to move the bar up and down until it is level with the desired pitch. Pressing 0 will now enter the note and the bar will move across one column. You can delete a note by pressing 1 — the bar will move back one column. Continue entering your notes until you have finished your composition.

Pressing E will add final specifications to the machine-code routine and then cause you to escape from the Basic composer program.

Your music can now be saved, together with all the other necessary data and routines by typing:

SAVE "BACKBOOGIE" CODE 60180,0 + 500

and loaded by typing:

LOAD "" CODE

To "switch on" your music during a program, include:

POKE 65534, 0: POKE 65535, 237: POKE 65532, 0: POKE 65533, 0
RANDOMIZE USR 60180

To "switch off" your music, include:

RANDOMIZE USR 60190

First, enter the composer program in listing 1 and save it by typing:

SAVE "COMPOSER" LINE 1

Now New the program and type in listing 2. Run the program and enter the code in listing 3, working from left to right and from type to bottom. When you have finished, the code will automatically be saved as Boogie.

If you do not wish to type in all the programs and code yourself, send a blank cassette, SAE and £1 to me at: 5 Western Drive, Shepperton, Middlesex TW17 8HJ.

Listing 2.

```
  10 DEF FN H(H$)=16*(CODE H$(1)
-48-(7 AND H$(1)>"9"))+CODE H$(2
)-48-(7 AND H$(2)>"9")
  40 FOR N=60148 TO 60288 STEP 8
  50 LET T=0
  60 PRINT N;" : ";
  70 INPUT H$: PRINT H$;
  80 FOR B=0 TO LEN H$-1 STEP 2
  90 LET Z=FN H(H$): LET T=T+Z
 100 POKE N+B/2,Z
 110 LET H$=H$(3 TO )
 120 NEXT B
 130 PRINT " = ";: INPUT Y: PRIN
T Y
 140 IF Y<>T THEN PRINT "INPUT E
RROR - TRY AGAIN": GO TO 50
 150 NEXT N
```

Listing 3.

```
60148 : 2102581103580616 = 259
60156 : C5061C1A77231310 = 446
60164 : FA23232323131313 = 447
60172 : 13C110ECC9000000 = 665
60180 : ED5E3E30ED47C900 = 950
60188 : 0000ED56C9000000 = 524
60196 : 0000000000000000 = 0
60204 : 00000000E5D5C5F5 = 884
60212 : 2AFEFF7ECB27CB27 = 1161
60220 : E56F26000100ECED = 852
60228 : 4A56235E2346234E = 507
60236 : 6069CDB503E12322 = 884
60244 : FEFF2AFCFF3E00BC = 1308
60252 : 280C2322FCFFF1C1 = 1062
60260 : D1E1FBC338003E26 = 1036
60268 : BD380218ED210000 = 541
60276 : 22FCFF2100ED22FE = 1099
60284 : FF18E30000000000 = 506
```

THE BBC

In this, the first part of his article, Fintan Culwin details a BBC editor with a simple background music facility.

THIS STARTED off as a seemingly simple editor. What I wanted was a means of preparing a data file which could be used by an assembler program to produce an interrupt driven tune. Once the code produced by the assembler had been installed, the tune would repeat itself until it was deactivated or the Break key pressed.

The problem with preparing a musical data file is that there needs to be a method of specifying the pitch and duration of the notes. Standard musical notation turned out to be the most sensible system to produce the file. Although this editor is based upon musical notation it is not presented as a music processor. It has a limited range of notes and, in particular, no capacity for a rest. It is, however, capable of producing simple tunes for accompanying games etc.

To make full use of the BBC's sound capacity it is not only necessary to manipulate the Sound command but also the Envelope command. Consequently, an envelope editor has been added to the system. Provision for a screen dump was included to allow the editor to produce sheet script.

What started out as a supposedly simple editor to produce a small data file became a fairly sophisticated project in its own right. The editor can cope with up to 200 notes over a one and a half octave range. The envelope can be modified over its full range; and will be saved with any data file produced.

Piano type envelope

To use the system enter listing 1, Intload and listing 2, Inttune. Running Intload will define the characters needed for the main program and produce a default piano type envelope. The characters are printed as a check and the second program loaded. For disc users the name of the second program will have to be defined, for tape users a blank Chain " " statement will load the next program on the tape.

When loaded the editor presents the user with a blank page. To define a note its pitch and duration have to be selected. The pitch of the note is controlled by the cursor's position on the stave. The cursor can be moved up and down the stave using the up and down arrow keys. The left and right arrow keys move the cursor backwards and forwards through the tune.

The duration of the note is indicated by the symbol in the lower right hand corner. The duration can be increased with the f0 key and decreased with the f1 key. A note is entered at the current cursor position by pressing Return. If the cursor is in the middle of a tune all succeeding notes will be shifted along to make space for the note being inserted.

If a note needs to be deleted, pressing the Delete key will remove the note from underneath the current cursor position and move back any succeeding notes. There is space on a page for 20 notes. Moving before or beyond this automatically takes you onto the next page. If this is too pedestrian then keys f5 and f6 will move backward and forward one page at a time. Pressing f2 will play all the current tunes using the current envelope.

After coming to terms with the musical setting the envelope editor can be invoked by pressing the f7 key. To understand the screen it is necessary to consult the User Guide. Page 245 identifies the effects of the 13 parameters and labels them. These labels are reproduced on the screen, alongside the current value of the parameter. The currently selected parameter is highlighted in inverse video.

A table of 13 numbers is almost impossible to comprehend. Above the table the settings of the parameters are indicated by 12 bargraphs split into four clusters. They are grouped as the PI parameters, the PN parameters, the AA,AS & AR parameters and the ALA and ALD parameters. A description of the effects of changing these parameters is given in the User Guide.

A practical appreciation can be obtained by experimentation. A parameter to be changed is highlighted using the left and right arrow keys. The value is changed within its limits using the up and down arrow keys. Pressing the Return key will sound the envelope; when you are satisfied pressing the Escape key will return to the music editor. The current envelope specification will be saved and recalled with any tune.

Pressing f8 causes a printer dump to be performed. In the configuration given page 10 of memory — &A00 to &AFF — is assumed to be available for use. This is acceptable for disc users, tape users will have to use page 14 — &D00 to &DFF. Examining listing 2 shows a dummy RTS code has been inserted.

If you want to use this facility then the Remmed *Load command will have to be activated, to load into memory your own screen dump code; and the dummy RTS command removed. This can be omitted if screen dumps are not required. When you are ready to leave the system f9 will cause an orderly return to Basic.

The basis of the editor is a list of note codes held in memory. Each note requires two bytes to define its duration and pitch. These are held in memory in the reserved byte array labelled tune%, defined and initialised within PROC prepare. The only obscure parts of the preparation are the definition of an Osword area which will be used to obtain character definitions for the double height plotting routine.

Retrieved from memory

There is no legitimate method to obtain an envelope definition within the operating system. Consequently the envelope parameters have to be retrieved from memory into the envelope% array using Peeks.

The first part of the main listing, as far as PROC MAIN contains various procedures concerned with screen operations. The most transportable procedure is PROC bigchar, whose parameter identifies a character to be plotted on a screen in double height. Using this procedure mollifies the effect of being forced to work in 20 column mode.

Listing 1.

```
 10 REM INT'LOAD
 20 REM EDITOR LOADER
 30 REM FINTAN CULWIN
 40 REM APRIL '85
 90 MODE4
100VDU23,240,16,20,18,16,104,120,120,48
110VDU23,241,48,120,120,104,16,18,20,16
120VDU23,242,16,20,18,16,104,121,120,48
130VDU23,243,48,120,121,104,16,18,20,16
140VDU23,244,16,16,16,16,104,120,120,48
150VDU23,245,48,120,120,104,16,16,16,16
160VDU23,246,16,16,16,16,104,121,120,48
170VDU23,247,48,120,121,104,16,16,16,16
180VDU23,248,16,16,16,16,104,88,72,48
190VDU23,249,48,72,88,104,16,16,16,16
200VDU23,250,16,16,16,16,104,89,72,48
210VDU23,251,48,72,89,104,16,16,16,16
220VDU23,252,0,0,0,56,68,72,112,0
230VDU23,253,0,0,0,56,68,73,112,0
240ENVELOPE4,3,0,0,0,0,0,0,121,-10,-5,
  -2,120,120
250FOR line= 1 TO 10
260  FOR char = 240 TO 253
270     VDU char,32
280     NEXT char
290  VDU 13,10,10
300NEXT line
310FOR pitch = 97 TO 177 STEP 8
320  SOUND 1,4,pitch,5
330NEXT pitch
340 PAGE=&1900
350 *K.10 PA.=&1900:MO.:M
360 CHAIN ""
```

BEEBSKI BEAT

The procedure works by obtaining a character definition with an Osword call. The definition obtained is used to redefine character 254 twice using the VDU 23 command; and sent to the screen.

The main routine is fairly straightforward; the key presses are trapped and used to select a routine from the second part of the program.

When loading a tune from disc or tape there is an option to load from the start of memory overwriting the tune in memory or appended to the end of the tune in memory. The envelope editor PROC-envel and associated procedures are extractable and can be used alone to investigate the envelope command.

As the program is reasonably structured, the routines are well Remmed and the variable names are sensibly chosen implementation should be fairly easy. I have not tested it but it should transfer directly to the Electron.

As mentioned at the beginning this was conceived as a simple editor that would be used to produce a file for an assembler program. The editor has grown into a more sophisticated system than I envisaged; but it still performs its intended function.

Keep hold of your data files, next month's program will use them as input to a system which will install the tunes into the micro. Consequently, the tune will repeat itself indefinitely until switched off or the machine is reset. This has obvious if rather tedious applications.

Listing 2.

```
 100MODE5
 140PROC_PREPARE
 150PROC_PAGE
 160PROC_CURSOR(count)
 170REPEAT
 180PROC_MAIN
 190UNTILend
 200PROC_FINISH
 210END
 1000DEFPROC_PREPARE
 1040dump%=&A00
 1050?dump%=&60
 1060DIMnote$(7,1),pitch(12),len
f(7),envel%(13),envel$(13),min(1
2),max(12)
 1070FORnote=0TO7
 1080note$(note,0)=CHR$(240+note
*2)
 1090note$(note,1)=CHR$(241+note
*2)
 1100NEXTnote
 1110note$(7,0)=CHR$(253)
 1120note$(7,1)=CHR$(253)
 1130note$(6,1)=CHR$(252)
 1140FORnum=1TO12:READpitch(num)
:NEXT
 1150FORnum=0TO7:READlenf(num):N
EXT
 1160*FX 4,2
 1170*FX 225,240,0
 1180*FX 229,1,0
 1190VDU23,0,10,96,0;0;0;
 1200VDU19,1,7;0;
 1210VDU19,2,3;0;
 1220VDU19,3,11;0;
 1230DIMtune%400
 1240FORN%=tune%TOtune%+400:?N%=
0:NEXTN%
 1250m=tune=tune%:ptr=tune%:coun
t=1
 1260cpage=0:level=6:note=3
 1270end=FALSE
 1280OSWORD=&FFF1:DIMosword%8
 1290X%=osword%MOD256:Y%=osword%
DIV256:A%=&A
 1300*FX 4,1
 1310temp=&8F0:FORpar=0TO13:enve
l%(par)=temp?par:NEXTpar
 1320FORpar=0TO12:READmin(par):N
EXT
 1330FORpar=0TO12:READmax(par):N
EXT
 1340FORpar=0TO12:IFmin(par)<0TH
ENenvel%(par)=FN_comp(envel%(par
))
 1350NEXTpar
 1360FORpar=0TO12:READenvel$(par
):NEXT
 1370VDU24,400;956;860;1023;18,0
,130,5,16,
 1380VDU18,0,0:temp$="IN'TUNE":F
ORloop=1TOLEN(temp$)
 1390PLOT4,352+loop*64,1016:PROC
bigchar(MID$(temp$,loop,1)):NEX
Tloop
 1400ENDPROC
 1500DEFPROC_FINISH
 1510CALL!-4
 1520ENDPROC
 1900DEFPROC_PAGE
 1910VDU24,0;0;1279;868;18,0,128
,16
 1920PROC_DISP
 1930PROC_note(note)
 1940GCOL0,1:PLOT4,8,36:PRINT"PA
GE ";
 1950GCOL3,2:PLOT4,320,36:PRINTS
TR$(cpage+1)
 1960PROC_fill(cpage)
 1970count=1
 1980ENDPROC
 2000DEFFN_comp(byte)
 2010IF(byteAND&80)<>&80THEN=byt
e
 2020IFbyte=0THEN=0ELSE=(byte-25
6)
 2100DEFPROC_DISP
 2110VDU24,0;256;1279;920;
 2120PROC_STAVE(1):PROC_STAVE(2)
 2130ENDPROC
 2200DEFPROC_STAVE(num)
 2210GCOL0,1
 2220IFnum=1THENnum=816ELSEnum=4
96
 2230FORoffset=0TO4
 2240pos=num-32*offset
 2250PLOT4,64,pos:PLOT1,996,0
 2260NEXToffset
 2270GCOL0,2
 2280ENDPROC
 2300DEFPROC_note(num)
 2310VDU24,1200;0;1279;72;18,0,1
30,16,26,
 2320VDU18,0,0,25,4,1208;64;:PRO
C_big(num,0)
 2330VDU18,0,2:ENDPROC
 2400DEFPROC_CURSOR(cpos)
 2410IFcpos>10THENypos=416:cpos=
cpos-10ELSEypos=736
 2420ypos=ypos+(level-6)*16
 2430xpos=cpos*96+16
 2440VDU24,xpos;ypos;xpos+32;ypo
s+32;18,3,131,16,18,0,2,26
 2450ENDPROC
 2500DEFPROC_fill(page)
 2510tcount=count:tptr=ptr
 2520offset=40*page+tune%
 2530IF?offset=0THENENDPROC
 2540disp=1::count=1
 2550REPEAT
 2560PROC_onenote(count,?offset,
offset?1)
 2570offset=offset+2:count=count
+1
 2580UNTILcount=210R?offset=0
 2590ENDPROC
 2600DEFPROC_onenote(num,pitch,d
uration)
 2610GCOL0,2
 2620IFnum>10THENy=480:num=num-1
0ELSEy=800
 2630x=32+num*96
 2640yoff=(pitch-6)*16
 2650PLOT4,x,y+yoff
 2660IFpitch>8THENdir=1ELSEdir=0
 2670PROC_big(duration-1,dir)
 2680ENDPROC
 2700DEFPROC_big(note,dir)
 2710IFnote>7THENENDPROC
 2720char$=note$(note,dir)
 2730IFdir=1THENPLOT0,0,-32
 2740PROC_bigchar(char$)
 2750ENDPROC
 2800DEFPROC_bigchar(char$)
 2810?osword%=ASC(char$):CALLOSW
ORD
 2820VDU23,254
 2830FORkount=1TO4
 2840VDUosword%?kount,osword%?ko
unt
 2850NEXTkount
 2860VDU254,10,8
 2870VDU23,254
 2880FORkount=5TO8
 2890VDUosword%?kount,osword%?ko
unt
 2900NEXTkount
 2910VDU254
 2920ENDPROC
 3000DEFPROC_MAIN
 3010*FX 21,0
 3020resp=GET
```

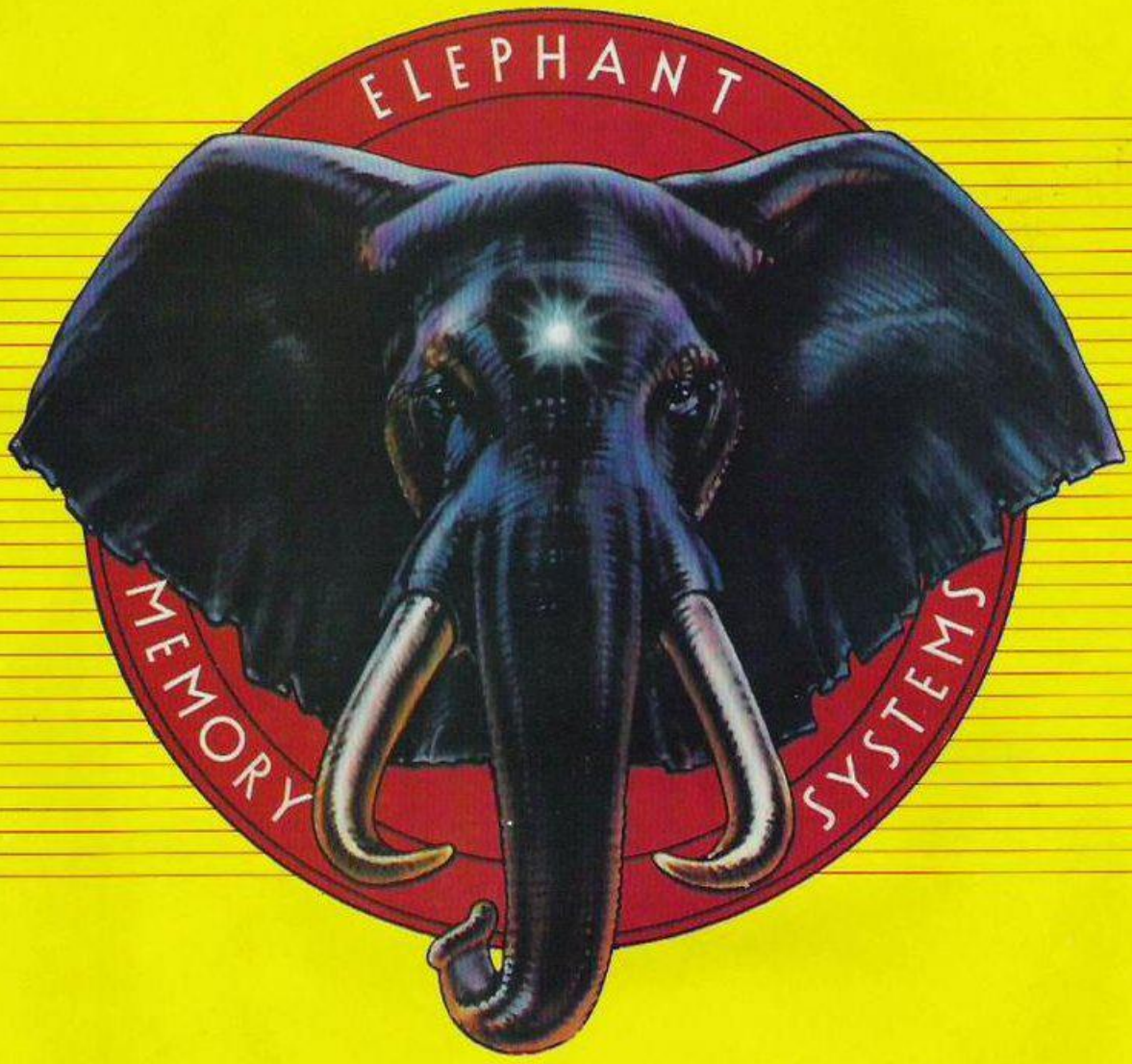
(continued on next page)

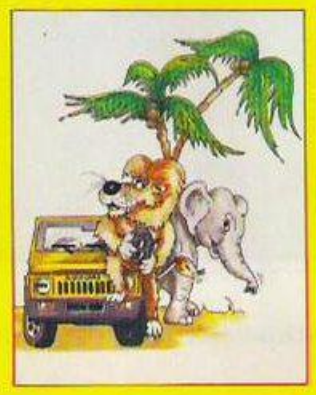
(continued from previous page)

```
3030IFresp=139THENPROC_UP(1)
3040IFresp=138THENPROC_UP(-1)
3050IFresp=240THENPROC_CHANGE(1
)
3060IFresp=241THENPROC_CHANGE(-
1)
3070IFresp=13THENPROC_enter
3080IFresp=137THENPROC_right(1)
3090IFresp=136THENPROC_right(-1
)
3100IFresp=242THENPROC_play
3110IFresp=243THENPROC_save
3120IFresp=244THENPROC_load
3130IFresp=245THENPROC_mpage(-1
)
3140IFresp=246THENPROC_mpage(1)
3150IFresp=247THENPROC_envel
3160IFresp=127THENPROC_del
3170IFresp=249THENPROC_quend
3180ENDPROC
3900DEFPROC_quend
3910PROC_window
3920PRINT'"  End (Y/N) ? ";
3930REPEAT
3940quend=GETAND223
3950UNTILquend=78ORquend=89
3960IFquend=89THENend=TRUE
3970PROC_nowindow
3980ENDPROC
4100DEFPROC_UP(dir)
4110IFlevel+dir>12ORlevel+dir<1
THENENDPROC
4120PROC_CURSOR(count)
4130level=level+dir
4140PROC_CURSOR(count)
4150ENDPROC
4200DEFPROC_CHANGE(dir)
4210IFnote+dir>7ORnote+dir<0THE
NENDPROC
4220note=note+dir
4230PROC_note(note)
4240ENDPROC
4300DEFPROC_enter
4310IFptr>mxtuneORmxtune=tune%+
400THENENDPROC
4320IFmxtune=ptrTHENPROC_endELS
EPROC_mid
4330SOUND1,4,pitch(level),lenf(
note)
4340ENDPROC
4400DEFPROC_end
4410?ptr=level:ptr?1=note+1
4420PROC_onenote(count,level,no
te+1)
4430PROC_right(1)
4440mxtune=ptr
4450ENDPROC
4460DEFPROC_mid
4470temp=mxtune-2
4480REPEAT
4490?(temp+2)=?(temp):?(temp+3)
=?(temp+1)
4500temp=temp-2
4510UNTILtemp=ptr-2
4520?ptr=level:ptr?1=note+1
4530mxtune=mxtune+2
4540tcount=count:PROC_PAGE:coun
t=tcount:PROC_CURSOR(count)
4550ENDPROC
4600DEFPROC_right(rit)
4610IFptr=mxtune+2ANDrit=1THENE
NDPROC
4620IFptr=tune%ANDrit=-1THENEND
PROC
4630PROC_CURSOR(count)
4640IFcount+rit<1ANDcpage>0cpag
e=cpage-1:PROC_PAGE:count=21
4650IFcount+rit>21ANDcpage<9cp
age=cpage+1:PROC_PAGE:count=1
4660count=count+rit
4670PROC_CURSOR(count)
4680ptr=ptr+rit*2
4690ENDPROC
4700DEFPROC_play
4710temp=tune%
4720REPEAT
4730SOUND&1,4,pitch(?temp),lenf
(?temp?1)-1:
4740temp=temp+2
4750UNTIL ?temp=0
4760ENDPROC
4800DEFPROC_del
4810IF?ptr=0THENENDPROC
4820FORtemp=ptrTOmxtune+2STEP2
4830?temp=temp?2:temp?1=temp?3
4840NEXTtemp
4850mxtune=mxtune-2
4860PROC_CURSOR(count)
4870PROC_PAGE
4880count=tcount:ptr=tptr
4890PROC_CURSOR(count)
4900ENDPROC
5000DEFPROC_save
5010IFtune%=mxtuneTHENENDPROC
5020PROC_window
5030INPUT"Filename ",file$
5040IFLEN(file$)=0THENPROC_nowi
ndow:ENDPROC
5050channel=OPENOUTfile$
5060FORpar=0TO12
5070BPUT#channel,envel%(par)
5080NEXTpar
5090FORloop=tune%TOmxtune-2STEP
2
5100BPUT#channel,?loop
5110BPUT#channel,(loop?1)
5120NEXTloop
5130CLOSE#channel
5140PROC_nowindow
5150ENDPROC
5300DEFPROC_load
5310over=FALSE
5320PROC_window
5330INPUT"Filename ",file$
5340IFLEN(file$)=0THENPROC_nowi
ndow:ENDPROC
5350IFmxtune>tune%THENPROC_quer
y
5360IFover=FALSETHENloop=mxtune
ELSEloop=tune%
5370channel=OPENUPfile$
5380FORpar=0TO12
5390envel%(par)=BGET#channel
5400NEXTpar
5410REPEAT
5420?loop=BGET#channel
5430loop?1=BGET#channel
5440loop=loop+2
5450UNTILEOF#channelORloop=tune
%+400
5460IFloop<tune%+400THEN'loop=0
5470mxtune=loop
5480PROC_nowindow
5490PROC_PAGE:count=tcount:PROC
_CURSOR(count)
5495ENVELOPE4,envel%(0),envel%(
1),envel%(2),envel%(3),envel%(4)
,envel%(5),envel%(6),envel%(7),e
nvel%(8),envel%(9),envel%(10),en
vel%(11),envel%(12)
5500ENDPROC
5600DEFPROC_query
5610PRINT"overwrite (Y/N) ";
5620REPEAT:onse=GETAND223
5630UNTILonse=89ORonse=78
5640IFonse=89THENPRINT"yes"ELSE
PRINT"no"
5650IFonse=89THENover=TRUE
5660PRINT"Loading....."
5670ENDPROC
5700DEFPROC_window
5710VDU24,0;128;1279;288;18,0,1
30,16,
5720VDU18,0,0,25,4,96;240;
5730ENDPROC
5750DEFPROC_nowindow
5760VDU18,0,128,16,26
5770ENDPROC
5900DEFPROC_mpage(dir)
5910IFcpage+dir<0ORcpage+dir>20
THENENDPROC
5920IFdir=1ANDptr+40>mxtuneTHEN
ENDPROC
5930ptr=ptr+dir*40:cpage=cpage+
dir
5940PROC_PAGE
5950count=tcount:PROC_CURSOR(co
unt)
5960ENDPROC
6000DEFPROC_envel
6010VDU24,0;0;1279;868;18,0,128
,16
6020FORpar=0TO12STEP2
6030PLOT4,0,320-par*24:PRINTenv
el$(par)
6040PLOT4,300,320-par*24:PRINTS
TR$(envel%(par))
6050PLOT4,620,320-par*24:PRINTe
nvel$(par+1)
6060IFpar<>12THENPLOT4,920,320-
par*24:PRINTSTR$(envel%(par+1))
6070NEXTpar
6080FORpos=1TO12:PROC_bar(pos):
NEXTpos
6090pos=5:PROC_hlt
6100REPEAT
6110*FX 21,0
6120resp=GET
6130IFresp=139THENPROC_inc(1)
6140IFresp=138THENPROC_inc(-1)
6150IFresp=137THENPROC_move(1)
6160IFresp=136THENPROC_move(-1)
6170IFresp=13THENPROC_sound
6180UNTILresp=27
6190PROC_PAGE:count=tcount
6195ENVELOPE4,envel%(0),envel%(
1),envel%(2),envel%(3),envel%(4)
,envel%(5),envel%(6),envel%(7),e
nvel%(8),envel%(9),envel%(10),en
vel%(11),envel%(12)
6200PROC_CURSOR(count)
6210ENDPROC
6400DEFPROC_inc(dir)
6410IFenvel%(pos)+dir<min(pos)O
Renvel%(pos)+dir>max(pos)THENEND
PROC
6420envel%(pos)=envel%(pos)+dir
6430IFpos>0THENPROC_bar(pos)
6440IFposMOD2=0THENx=300ELSEx=9
20
6450y=294-((pos/2)MOD7)*48
6460VDU18,0,128,24,x;y;x+256;y+
32;16,26,18,0,1
6470PLOT4,x,y+32:PRINTSTR$(enve
l%(pos))
6480ENDPROC
6500DEFPROC_sound
6510ENVELOPE4,envel%(0),envel%(
1),envel%(2),envel%(3),envel%(4)
,envel%(5),envel%(6),envel%(7),e
nvel%(8),envel%(9),envel%(10),en
vel%(11),envel%(12)
6520SOUND1,4,128,10
6530SOUND1,4,64,10
6540SOUND1,4,192,10
6550ENDPROC
6560DEFPROC_hlt
6570IFposMOD2=0THENx=0ELSEx=620
6580y=294-((pos/2)MOD7)*48
6590VDU18,3,130,24,x;y;x+192;y+
32;16,18,0,127,26
6600ENDPROC
6700DEFPROC_bar(pos)
6710IFpos<4THENoff=pos-1:x=40
6720IFpos>3ANDpos<7THENoff=pos-
4:x=340
6730IFpos>6ANDpos<11THENoff=pos
-7:x=640
6740IFpos>10THENoff=pos-11:x=10
00
6750VDU18,0,128,24,x+off*60;400
;x+40+off*60;788;16,18,0,130,
6760heit=526+envel%(pos)
6770IFheit>525THENVDU24,x+off*6
0;526;x+40+off*60;heit;16,
6780IFheit<526THENVDU24,x+off*6
0;heit;x+40+off*60;526;16,
6790GCOL0,128
6800ENDPROC
6900DEFPROC_move(dir)
6910IFpos+dir<0ORpos+dir>12THEN
ENDPROC
6920PROC_hlt:pos=pos+dir:PROC_h
lt
6930ENDPROC
20000DATA 101,109,117,121,129,13
7,145,149,157,165,169,177
20010DATA 5,7,10,15,20,30,40,60
20012DATA 0,-128,-128,-128,0,0,0
,-127,-127,-127,-127,0,0
20014DATA 255,127,127,127,255,25
5,255,127,127,0,0,126,126
20020DATA TIM,PI1,PI2,PI3,PN1,PN
2,PN3,AA,AD,AS,AR,ALA,ALD
>
```

■

WIN A SAFARI TO KENYA





An opportunity to win a super ELEPHANT Safari for two persons – luxury accommodation, travel and all expenses paid – with every purchase of a 10-disk ELEPHANT pack made between 1st April and 30th June 1985!
Look for your participating ELEPHANT Dealer's special Competition Display and pick up a simple puzzle card with your purchase. Send it to us with an ELEPHANT 10-pack top to receive, completely free, an ELEPHANT "T" shirt and an opportunity in this exciting competition. Each subsequent 10-pack purchase and completed puzzle card gives you another opportunity – there's no limit!
Should you have difficulty in obtaining ELEPHANT products, phone or write for details of your nearest Dealer.

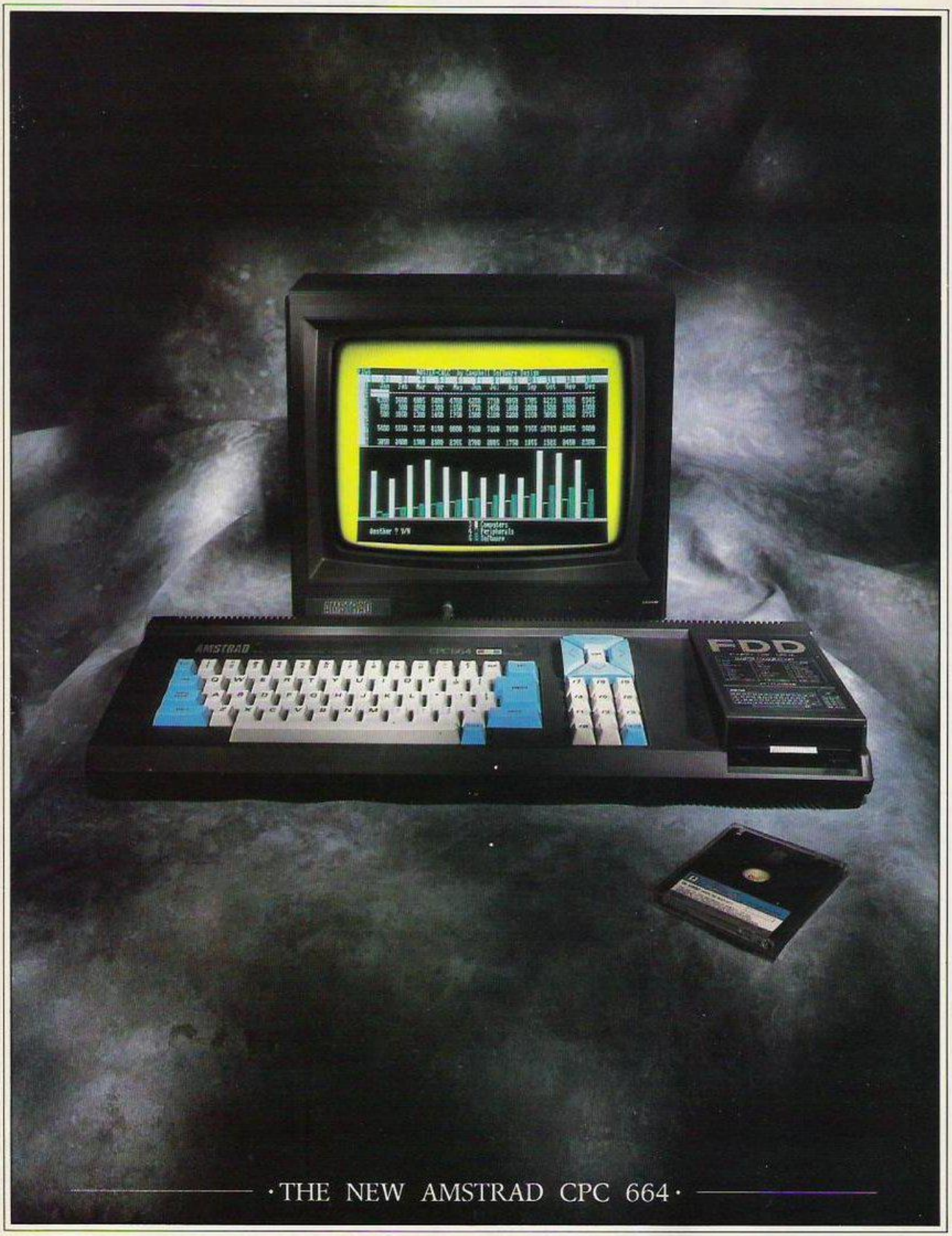
Dennison

ELEPHANT NEVER FORGETS

Dennison Manufacturing Co. Ltd.
Colonial Way, Watford, Herts WD2 4JY, Tel: Watford (0923) 41244, Telex: 923321

France: Soroclass, 45, rue de l'Est - 92100, Boulogne.
Tel. Reseau de Distribution: 605.98.99, Administration des Ventes: 605.70.78, Telex: EMS 206 436 E
Germany: Marcom Computerzubehör GmbH, Podbielskistr. 321, 3000 Hannover 51, Tel: (0511) 647420, Telex: 923818
Other Countries: Dennison International Company, 4006 Erkrath 1, Matthias-Claudius-Strasse 9, Telex: 858 6600

· THE NEW AMSTRAD CPC 664 WITH BUILT-IN DISC DRIVE



· THE NEW AMSTRAD CPC 664 ·

· AVAILABLE AT BOOTS · COMET · CURRYS · DIXONS · GREENS · JOHN MENZIES · RUMBELOWS

If you know anything about computers you'll know that disc drives are up to fifty times faster than cassette when you're loading and saving programs. In fact, a disc drive makes computing faster, more reliable, more efficient and more fun. But up till now the only way to gain these advantages for a home computer was to buy a separate disc drive attachment. Now Amstrad are pleased to announce the first complete home computer with built-in disc drive: The Amstrad CPC 664.

And when you buy a CPC 664 you'll find it's not just the disc drive that's built-in.

You'll get everything you need, including a monitor (green screen or full colour). We'll even give you a free CPM and Logo disc, so all you do is plug in and you're in business.

WITH COLOUR MONITOR AROUND

· £449 ·

WITH GREEN SCREEN AROUND

· £339 ·

THE HOME COMPUTER THAT MEANS BUSINESS.

BUSINESS OR · PLEASURE ·

Although a disc drive will make games more fun (and there are loads of them to choose from) it also makes the CPC 664 a serious proposition for the business user.

There are accounting, word-processing, spread-sheet and data-base programs (to name but a few).

The CPC 664 is also supplied with CP/M* to help make your business more efficient and effective by providing access to the famous range of CP/M* software.

Wordprocessing with Amsword can improve the productivity of everyone from unskilled typist to trained secretary. Around £23.95.

Amsoft Business Control, is a complete suite of programs for integrated sales invoicing, stock control and sales ledger for around £99. (Requires an additional FD-1 disc drive around £159 and DL-2 cable around £7).

HIGH PERFORMANCE · LOW COST ·

The one thing you won't need a computer to work out is that the Amstrad CPC 664 represents outstanding value for money.

You only have to check the cost of buying all the elements separately (64K computer, disc-drive, monitor) to realise that the Amstrad package is very hard to beat.

With a green screen monitor the cost is just £339. With a full colour screen it costs £449. And after you've saved money on the price of the computer itself, you go on saving on the price of software.

There are hundreds of programs for business or pleasure available on disc (and cassette) to CPC 664 users. Many from Amsoft, others from other famous-name software houses. Few will cost you more than £49 and most will cost you considerably less.

AN EXPANDING · SYSTEM ·

There is a complete range of peripherals available to CPC 664 users which plug directly into the built-in interfaces.

These include a joystick, additional disc drive (to double your on-line storage) and the Amstrad DMP-1 dot-matrix printer. (There's also a cassette interface so that you can use CPC 464 programs on tape). And there are many more peripherals from Amstrad and other manufacturers which can be used to enhance the CPC 664.

· AMSTRAD USER CLUB ·

Join the optional Amstrad User Club and we'll keep you informed with our monthly user magazine, and information on all software as it is introduced. Your membership details will be recorded on your personal club card, which entitles members to various privileges and offers.

Figure analysis made easy with Microspread. An easy to use spreadsheet with pull-down menus and a wide range of mathematical options. Around £49.

Please send me more information

Name _____

Address _____

_____

_____

Amstrad CPC 664

Amstrad, P.O. Box 462, Brentwood, Essex CM14 4EE

YC/664/2

*CP/M is a trademark of Digital Research Inc.

HERE'S A colourful asteroids-style game for the Amstrad CPC-464. While using Mode 1 it manages to give a whole range of colours and provides Mode 0 size text printing on the screen using a Rom indirection. Get yourself a high score by shooting the eggs and aliens but watch the bonus. Quick shots will score well but be slow and the bonus will turn against you!

The game features 44 sprites of different sizes with up to 25 on the screen at any one time. These are controlled by a machine-code routine that can easily be adapted for your own purposes. In fact, most of the action is controlled by machine-code making the main Basic game loop very short and speedy.

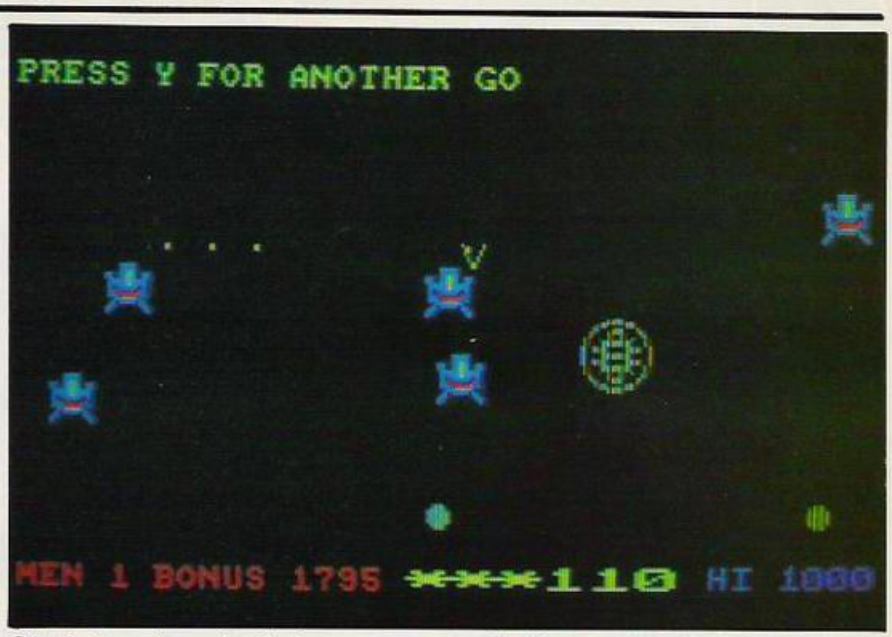
The main program appears in listing 1 and may be typed in directly. It should be saved — with Goto 20000 — before running as any mistakes in the data may cause the system to crash. The machine-code is in five routines, three of which are listed so that you can used them in your own programs. The first one — listing 2 — is for wide printing mimicking mode 0 printing.

In fact, it will work in any two bytes to reset the cursor position. It works by altering the high byte of the Rom indirection at &BDD5 using Poke so that instead of pointing to the Rom routine at &134A, it points to our routine at &A34A.

We can then use the usual Print command including the Print Using format. The colour of the printing is given by the pen mask — changing this can give striped writing or mixed colours. Note that the indirection supplies the screen position as a physical

Listing 1.

```
10 REM ******************************
20 REM *          SPACE EGGS        *
30 REM *             by             *
40 REM *   Christopher Leigh        *
50 REM ******************************
100 GOTO 3000
200 LOCATE 12,25:PRINT b$;:LOCATE 10,25:POKE &BDD5,&A3:
PRINT USING "######";score:POKE &BDD5,&13:RETURN
1000 REM ** main loop **
1010 IF INKEY(27)=0 THEN head=(head+1)AND 7:ERASE,&A5
00:POKE &A5B6,17+head+&A5:POKE &A5B0,1
1020 IF INKEY(35)=0 THEN head=(head+7)AND 7:ERASE,&A5
00:POKE &A5B6,17+head+&A5:POKE &A5B0,1
1030 gx=(head=5 OR head=4 OR head=7)-(head=1 OR head=2
 OR head=3):hx=(head=3 OR head=4 OR head=5)-(head=7 OR
 head=0 OR head=1)
1040 IF INKEY(60)=0 THEN POKE &A5B3,(PEEK(&A5B3)+hx)AN
D 255:POKE &A5B4,(PEEK(&A5B4)+gx)AND 255
1050 IF INKEY(47)=0 THEN SOUND 138,10,10,15,1,1:CALL &
A000,gx,hx
1060 IF INKEY(63)=0 THEN for n=50 TO 10 STEP-2:SOUND 1
38,n,5,15,1,1:NEXT:ERASE,&A5B0:POKE &A5B0,1:POKE &A5B
1,RND*79:POKE &A5B2,RND*47
1070 FOR n=0 TO y:INKEY:IMOVE:b%=b%-5:CALL &A700,@x%:I
F x%=0 THEN 1010 ELSE IF x%=4 THEN 2000
1080 IF x%=3 THEN SOUND 133,800,150,15,2,1:score=score
+20:GOTO 1010
1090 IF x%=2 THEN SOUND 133,10,100,15,2,1:score=score+
50:GOTO 1010
1100 IF x%=1 THEN SOUND 133,10,150,15,2,2,30:score=sco
re+100:z%=z%-1:IF z%<0 THEN 1010 ELSE score=score+b%:
POKE &A5B3,RND*3:POKE &A5B4,RND*3:GOTO 4000
2000 REM ** lives **
2010 BORDER 3:SOUND 135,100,150,15,2,2,15:FOR n=0 TO
10:NEXT:BORDER 0
2020 men=men-1:IF men=0 THEN DI:LOCATE 1,25:PRINT "MEN
":men:EI:ERASE,&A5B0:POKE &A5B0,1:POKE &A5B1,39:POKE
&A5B2,24:GOTO 1000
2030 IF score>hi THEN hi=score
2040 POKE &A5B1,39:POKE &A5B2,24:POKE &A5B3,0:POKE &A5
B4,0:POKE &A5B6,&A5
2050 DI:PEN 3:LOCATE 1,5:PRINT "PRESS Y FOR ANOTHER GO
":PEN 2:EI
2060 IF INKEY(43)>-30 THEN 2060 ELSE head=0:men=3:score
=0:GOTO 4000
3000 REM ** start game **
3010 MODE 1:BORDER 1:INK 3,24:INK 2,21:INK 1,16:INK 0,
1:MEMORY &A2FF
3020 FOR n=&A34A TO &A37F:READ a:POKE n,VAL("&"+a):N
EXT
3030 DATA e5,f5,cd,1a,bc,f1,eb,cd,a5,bb,86,07,4e,e5,d5
,8b,84,af,ch,21,30,02,f6,cc,ch,21,38,02,4a,33,12,13,10
,ef,d1,e5,21,00,00,19,eb,e1,23,c1,10,de,e1,24,24,24,2c
,c5,75,bb
3040 DATA 3:LOCATE 2,2:POKE &BDD5,&A3:PRINT "SPACE EGGS
":POKE &BDD5,&13:PRINT "by C.J.Leigh"
3050 PEN 2:PRINT:PRINT " Due to a fault in your hyper
space      generator you find yourself in an      unch
arted region of space. Suddenly alryour emergency sys
tems go wild and your sights are filled with strange e
gg like"
3060 PRINT "creatures. Madly you fire your laser      ca
non but hitting an egg merely releasesthe aliens and h
itting them produces      even more seed eggs. And all
the time the void is filled with alien screams."
3070 PRINT "If you are not quick enough they will ge
t you and then you will scream as the madness takes ov
er."
3080 GOSUB 10000
3090 PEN 1:LOCATE 1,20:PRINT " Use I & P for rotate l
eft and right;          S for subspace thrusters;
                        X for hyperspace jump
Space for fire"
3100 IF INKEY(47)=" THEN 3100
3110 IF INKEY#="" THEN 3110
3120 a%=0:head=0:hi=10000:men=3:score=0
3130 DI:ENT 1,5,-1,1:ENT -1,15,10,1,15,-10,1:ENV 2,15,-1
,10:ENT 2,15,10,10
3140 EVERY 50,2 GOSUB 200
4000 REM ** new screen **
4010 BORDER 0:INK 0,0:INK 1,11:INK 2,6:INK 3,18:MODE 1
:b%=3000:x%=16:POKE &A082,8:IF score>4000 THEN p%=8 EL
SE p%=40
4020 DI:LOCATE 1,25:PEN 2:PRINT "MEN":men;"BONUS":b%;L
OCATE 10,25:POKE &BDD5,&A3:PRINT USING "######";score:
:POKE &BDD5,&13:PEN 1:PRINT " HI";hi:PEN 2:EI
4030 FOR n=100 TO 000 STEP 20:SOUND 7,n,10,15:NEXT
4040 FOR n=1 TO 8:POKE &A5B0+n*9,8:NEXT
4050 FOR n=7 TO 12:POKE &A5B0+n*9,1:NEXT
4060 FOR n=12 TO 36:POKE &A5B0+n*9,0:NEXT
4070 GOTO 1000
10000 REM ** machine code **
10010 FOR n=&A480 TO &A8BF:READ a$:POKE n,VAL("&"+a$)
10020 NEXT:CALL &A400:RETURN
10030 DATA 01,0e,a4,21,0a,a4,cd,d1,bc,c9,00,00,00,00,1
6,a4,c3,ec,a4,c3,2b,a4,45,52,41,53,c5,4d,4f,5a,c5,00
10040 DATA dd,21,00,a5,10,49,21,ca,a4,36,00,dd,7e,01,8
0,00,00,cd,79,a4,21,ca,a4,dd,7e,05,77,dd,7e,02,dd,86,0
4,f2,4a,a4,cb,38,fe,38,38,e2,d6,38,dd,77,02
10050 DATA dd,7e,01,dd,86,03,f2,5a,a4,cb,38,fe,38,38,0
2,d6,38,77,01,dd,7e,00,00,cd,79,a4,11,09,00,dd,19,d
d,7e,00,11,38,01,11,38,f2,c9
10060 DATA f5,dd,36,00,e4,44,4f,dd,66,02,dd,5e,06,dd,56,0
7,1a,47,dd,13,f1
10070 DATA e5,f5,d5,11,00,00,f5,7c,fe,38,38,02,d6,38,c
b,3f,38,02,18,02,cf,26,00,4f,d5,29,29,29,29,e5,d1,29,2
9,19,d1,19,16,c8,5f,19,d1
10080 DATA 3e,04,f5,d5,e5,1a,fe,00,28,0c,7e,fe,00,20,0
3,dd,77,00,1a,ea,ff,77,12,23,dd,28,00,d5,af,11,50,00,e
1,52,d1,19,d1
10090 DATA e1,01,00,00,09,c1,f1,3d,20,d5,f1,e1,24,2d,2
0,e2,c9
10100 DATA d5,21,ca,a4,36,00,dd,e1,dd,36,00,00,dd,7e,0
1,c3,79,a4,00
11000 REM ** move data **
11010 REM ** spaceship & bullets
11020 DATA 01,27,18,00,00,ff,65,a6,00
11030 DATA 00,00,00,00,00,ff,68,a6,00,00,00,00,00,00,f
f,68,a6,00
11040 DATA 00,00,00,00,00,ff,68,a6,00,00,00,00,00,00,f
f,68,a6,00
11050 DATA 00,00,00,00,00,ff,68,a6,00,00,00,00,00,00,f
f,68,a6,00
11060 DATA 00,00,00,00,00,ff,68,a6,00,00,00,00,00,00,f
f,68,a6,00
11070 ; asteroids
11080 DATA 01,16,80,01,01,a5,ed,a6,00,01,31,00,ff,01,f
a,ed,a6,00
11090 DATA 01,28,20,01,00,af,ed,a6,00,01,31,21,00,ff,d
7,ed,a6,00
11100 DATA 00,00,00,01,ff,ff,7e,a7,00,00,00,00,ff,ff,f
f,7e,a7,00
11110 DATA 00,00,00,00,ff,ff,7e,a7,00,00,00,00,ff,ff,f
f,7e,a7,00
11120 DATA 00,00,00,ff,01,ff,7e,a7,00,00,00,00,01,ff,f
f,7e,a7,00
11130 DATA 00,00,00,00,01,ff,7e,a7,00,00,00,00,01,00,f
f,7e,a7,00
11140 DATA 00,00,00,fe,fe,0f,bf,a7,00,00,00,00,02,fe,f
0,bf,a7,00
11150 DATA 00,00,00,fe,00,a5,bf,a7,00,00,00,00,00,02,e
5,bf,a7,00
11160 DATA 00,00,00,02,02,ff,bf,a7,00,00,00,00,fe,02,f
f,bf,a7,00
11170 DATA 00,00,00,02,00,f5,bf,a7,00,00,00,00,fe,5f
f,bf,a7,00
11180 DATA 00,00,00,fe,fe,5f,bf,a7,00,00,00,00,02,fe,f
5,bf,a7,00
11190 DATA 00,00,00,fe,00,bf,a7,00,00,00,00,00,02,0a
,bf,a7,00
11200 DATA 00,00,00,02,02,a5,bf,a7,00,00,00,00,fe,02,a
,bf,a7,00
11210 DATA 00,00,00,02,00,fb,bf,a7,00,00,00,00,00,fe,0
f,bf,a7,00
11220 ; extra
11230 DATA 02,02,09,01,00,ff,11,a0,00,00,00,0a,01,01,f
f,a0,a0
11240 DATA 02
12000 REM ** shape data **
12010 ; bullet & spaceship
12020 DATA 01,00,66,66,00
12030 DATA 02,cc,00,33,00,00,cc,00,33,00,33,00,cc,33,0
0,cc,00
12040 DATA 02,00,00,00,00,00,44,00,44,cc,22,33,22,00,4
f,00,33
12050 DATA 02,00,11,00,11,44,22,44,22,22,44,22,44,11,0
0,11,00
12060 DATA 02,11,00,11,00,22,00,22,00,44,33,44,cc,ff,0
0,cc,00
12070 DATA 02,00,33,00,cc,33,00,cc,00,cc,00,33,00,00,c
c,00,33
12080 DATA 02,cc,00,ff,00,44,cc,44,33,22,00,22,00,11,0
0,11,00
12090 DATA 02,11,00,11,00,22,00,44,22,44,22,44,22,00,1
1,00,11
12100 DATA 02,00,33,00,ff,33,22,cc,22,00,44,00,44,00,0
0,00,00
12110 ; asteroids
12120 DATA 00,00,00,77,ee,00,00,00,33,ff,ff,cc,00,00,7
7,00,11,ee,00
12130 DATA 00,cc,33,cc,33,00,11,00,77,ee,11,00,33,00,6
6,ee,00,cc
12140 DATA 66,22,66,66,44,66,66,11,ff,ff,00,66,66,11,f
f,ff,00,6A
12150 DATA cc,ff,00,11,ff,33,cc,ff,00,11,ff,33,cc,11,f
f,ff,00,33
12160 DATA cc,11,ff,ff,00,33,cc,ff,00,11,ff,33,cc,ff,0
0,11,ff,33
12170 DATA 66,11,ff,ff,00,66,66,11,ff,ff,00,66,66,22,6
6,66,44,66
12180 DATA 33,00,66,66,00,cc,11,00,77,ee,11,00,00,cc,3
3,cc,33,00
12190 DATA 00,77,00,11,ee,00,33,ff,cc,cc,00,00,00,77
7,ee,00,00
12200 DATA 04,00,70,e0,00,00,70,e0,00,00,71,e0,00,00,7
1,e0,70
12210 DATA e0,71,e0,70,70,71,f0,e0,70,71,f0,e0,61,f0,f
0,60
12220 DATA 61,70,e1,60,70,0f,e0,70,07,1e,e0,10,f0,f
0,00
12230 DATA 30,70,e0,c0,70,00,e0,c0,00,00,70,c0,00,00,
0,30
12240 DATA 02,33,cc,77,ee,ff,ff,ff,ff,ff,ff,ff,ff,77,e
e,33,cc
13000 REM ** check collision **
13010 DATA af,21,ca,a4,77,e0,77,dd,21,00,a5,11,09,00,0
e,04,dd,be,00,20,03,71,c9,dd,19,0b,24,af,dd,be,00,20,1
e,3a,21,a5,dd,be,01,20,16,3a,dd,be,01,20,18,3a,21,a5,d
d,be,02,28,0b,3a,dd,be,02,20,02,71,c9,dd,19,10,d0
13020 DATA dd,21,07,a5,dd,36,af,dd,be,00,c4,70,dd,e1
9,10,f5
13030 DATA fd,21,75,a5,dd,86,04,3a,dd,ce,04,49,a8,dd,80
d,cd,49,a8,dd,18,dd,3a,dd,dd,be,00,20,04,71,c3,70,dd,d
d,19,10,f1,c9
13040 DATA dd,be,00,20,21,71,00,cd,70,a8,fd,36,00,01,f
d,36,09,01,dd,7e,01,fd,77,01,fd,77,0a,dd,7e,02,fd,77,0
2,fd,77,0b,f1,c9,fd,19,fd,19,00,19,10,dc,c9
13050 DATA c5,d5,e5,cd,f4,a4,e1,d1,c1,c9
13060 REM ** fire bullets **
13070 DATA 00,dd,4e,00,dd,46,02,c5,3e,02,a8,cc,b9,fe,4
0,30,21,af,32,02,a8,cc,b9,fe,a0,d0,cd,ec,a4,e1,36,0f
1,eb,15,cd,20,cb,21,21,e5,7e,01,12,15,23,7e,00,12,15,
23,7e,01,12,15,23,7e,00,12,c9
20000 SPEED WRITE 1:SAVE "space eggs"
20010 SPEED WRITE 0:SAVE "space eggs"
20020 PRINT CHR$(7)"Rewind the tape":CAT
```



Christopher Leigh presents a new version of a favourite shoot-'em-up using sprites in glorious colour.

SPACE EGGS

position — top left = 0, 0 — whilst the cursor must be reset to the logical position — top left = 1, 1 — hence the extra increment instructions.

The second and third routines control the sprites and are called using Resident System Extension (RSX) commands. Move and Erase must be preceded by the elongated colon — shift @ — and 1Erase must be followed by a comma and its parameter which is the address of the first byte of the move data for the sprite.

The screen is 80 bytes wide and the sprite routines divide it into 50 half lines high, so that each sprite unit is a quarter of a Mode 1 character. These routines can cope with sprites of any size and — with slight alterations — of any shape. All our sprites will be set in a square sprite shape definition, but since zero bytes are not written to the screen — making the sprite transparent — the sprite can be any shape within that framework.

As written the procedure allows full wrap-around, adjusting for sprites being partly off a screen edge. Again fairly simple alterations will allow sprites to bounce.

1Erase simply erases a sprite and turns it off. 1Move works by calculating the old sprite position and then writing it with an ink mask of zero to rub it out, then calculating the new position and writing with the ink mask given in the move data.

This ink mask can be set to produce pure colours or colour mixtures for a whole sprite. The new position is calculated by adding the speed components to the old position and then ensuring it is on the screen. The move data also includes the address of the shape data for a particular sprite and a collision byte. This collision byte is the last non zero byte read off the screen when writing the sprite. This allows us to know if it is on top of anything and also what it is n top of.

The move data consists of nine bytes formatted thus: on/off flag, right position, down position, right speed, down speed, ink mask, shape address low, shape address high, collision byte. 1Move will, in fact, move every sprite, whose on/off flag is one, in the block of move data and the routine is stopped by a value of two. The shape data address can be altered to change the shape of a sprite during the game as is done to rotate your space ship.

The first byte of the shape data is the size of the sprite in quarters. The rest of the shape data comprises bytes made up in the same way as characters are plotted on the screen in Mode 1.

As already suggested, 1Move only needs to be called once a game cycle to move everything. Printing of score and bonus is done once a second by calling the routine at line 200. All that remains is to read the keys, produce sound effects, check for collisions and keep the bullets firing.

For the sake of speed the last two requirements are covered by two routines tailored for this game. Collision checking is done by reading the collision flags of each sprite and by checking for identical positioning. The latter is only needed for a stationary sprite.

Eight bullets are allowed on screen at any time so as each is fired the one eight back must be erased. Key checking is left in Basic so that you can easily change the program to suit your fingers, and the speed can be changed using p% in 1070 and 4010.

Note that your subspace thrusters always work in the direction you are pointing so that once moving you need to turn round in order to slow down. Remember your hyper space dive is kaput so using it could well land you in the middle of one of those eggs or in the firing line of your own bullets. The faster you shoot the aliens the larger the bonus — if you take too long your bonus will become negative having a disastrous effect on your score!

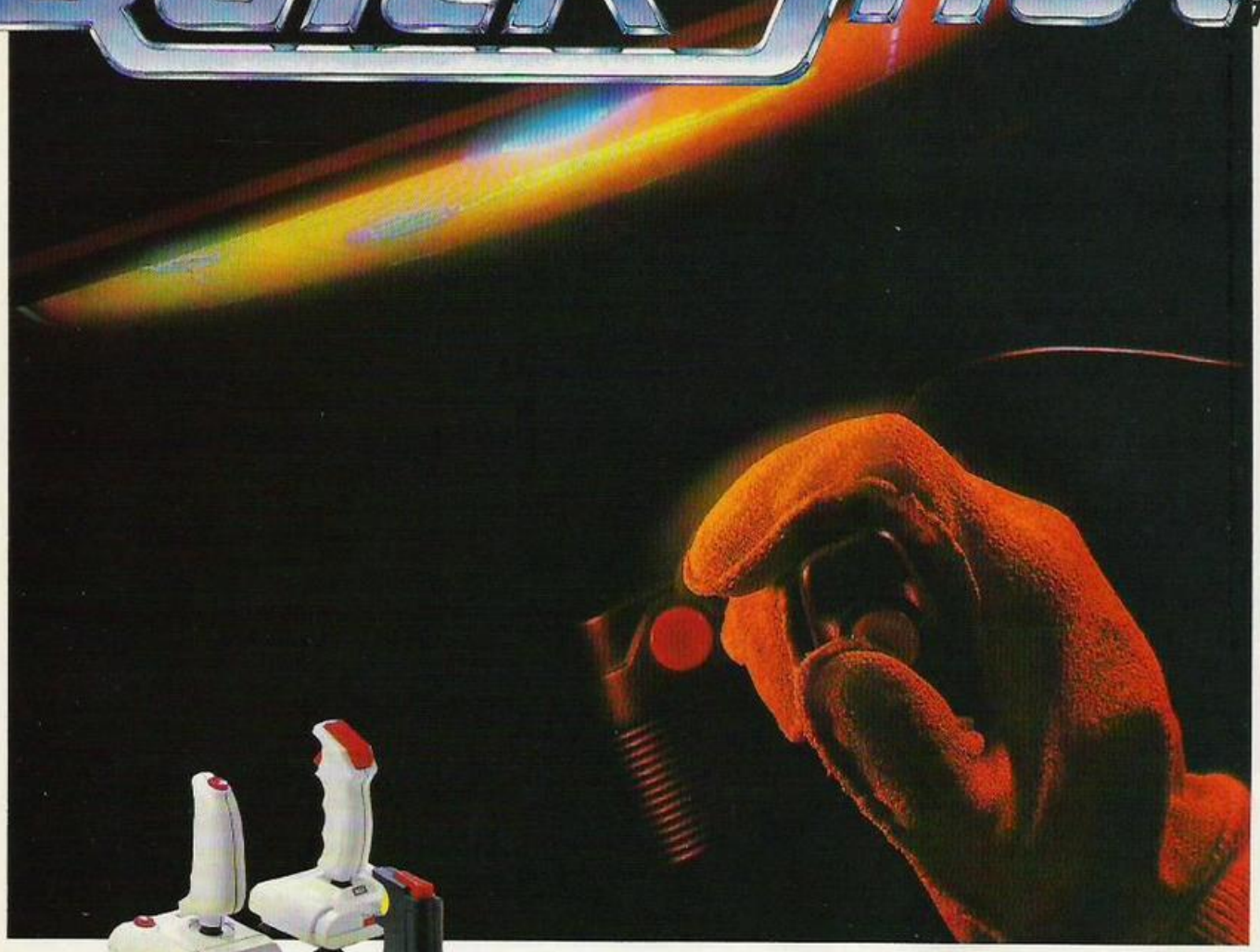
Should you wish to start firing immediately without typing in the lengthy data, you should send £3 for a tape to C.J. Leigh, 12 The Bassetts, Cashes Green, Stroud, Glos GL5 4SJ. Ask for Space Eggs and don't forget your name and address.

Listing 2.

```
                ORIGIN  A34A
E5              PUSH HL         ;save cursor position
F5              PUSH AF         ;save character code
CD1ABC          CALL BC1A       ;SCR_CHAR_POSITION
F1              POP AF
EB              EX DE,HL        ;screen address in DE
CDA5BB          CALL BBA5       ;TXT_GET_MATRIX
0607            LD B,07         ;only top 7 rows
4E      CHRROW  LD C,(HL)       ;character byte
C5              PUSH BC
D5              PUSH DE
0604            LD B,04         ;stretch to 4 bytes
AF      BYTE    XOR A
CB21            SLA C           ;first pixel
3002            JRNC 02         ;pixel to screen byte
F6CC            OR A,CC         ;mask pen 3
CB21            SLA C           ;next pixel
```

(continued on page 67)

QuickShot™



Shoot to win!

Winning is all that matters when playing video games. SVI "QuickShot" joysticks give you a better grip on games which are getting tougher each day. That's why over 4.5 million have been sold since 1982.

SVI "QuickShot" is the original, award-winning joystick that offers true one-hand control with features like a hand-contoured controller, thumb/trigger fire button and suction cups that give the thrill of arcade game play.

SVI "QuickShot" joysticks are getting better each day. They have more winning features than ever. There are models with auto-fire switch, touch-firing pad, interchangeable controllers and for the latest MSX computers.

Go with the winner and see the wide range of SVI "QuickShot" joysticks at your nearest dealer.

SVI "QuickShot" Joysticks.
4,500,000 Sold Worldwide.

SVI™ SPECTRAVIDEO

INNOVATIVE COMPUTING FOR TODAY AND TOMORROW

SOLE AGENT:
Spectravideo Ltd.
165 Garth Road Morden, Surrey SM4 4LH U.K.
Tel.: 01-3300101 Tlx.: 28704 MMHVAN G

MSX is a registered trademark of Microsoft Corporation.

(continued from page 65)

```
3002          JRNC 02
F633          OR A,33          ;other half of byte
12            LD (DE),A        ;byte to screen
13            INC DE           ;next screen address
10EF          DJNZ BYTE        ;back for next pixel
D1            POP DE           ;screen address
E5            PUSH HL          ;save matrix address
210008        LD HL,800
19            ADD HL,DE        ;next screen row
EB            EX DE,HL         ;back in DE
E1            POP HL
23            INC HL           ;next character byte
C1            POP BC           ;recover row count
10DE          DJNZ CHRROW      ;next character row
E1            POP HL           ;recover cursor position
24            INC H
24            INC H
24            INC H
2C            INC L            ;reposition cursor
C375BB        JP BB75          ;TXT_SET_CURSOR
```

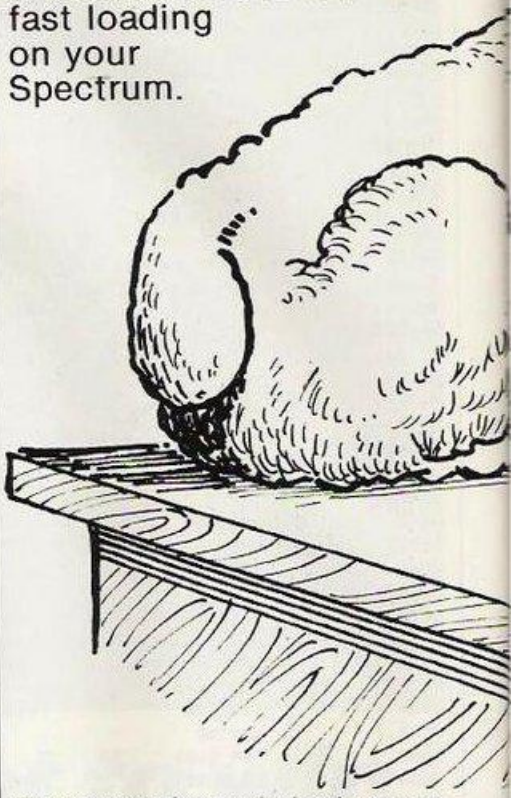
Listing 3.

```
              ORIGIN A400
010EA4   LOGON LD BC,JMPTAB    ;set up new commands
210AA4        LD HL,BUFFER     ;system workspace
CDD1BC        CALL BCD1        ;KL_LOG_EXT
C9            RET
00000000 BUFFER DEFS 4
16A4     JMPTAB DEFW NMETAB    ;command names address
C3ECA4        JP ERASE
C320A4        JP MOVE
4D524153      DEFM "ERAS"
C5            DEFB "E"+80
4D4F56        DEFM "MOV"
C5            DEFB "E"+80
00            NOP              ;end marker
DD2100A5 MOVE LD IX,A500
1849          JR CHKEND
21CAA4   NEXSPR LD HL,MASK+1
3600          LD (HL),0
DD7E01        LD A,(IX+1)      ;right position
000000        DEFS 3           ;for MC_WAIT_FLYBACK
CD79A4        CALL WRISPR      ;erase old sprite
21CAA4        LD HL,MASK+1
DD7E05        LD A,(IX+5)      ;sprite mask
77            LD (HL),A
DD7E02        LD A,(IX+2)      ;down position
DD8604        ADD A,(IX+4)     ;down speed
F246A4        JP P,02
C630          ADD 30           ;ensure positive
FE30          CP 30
3802          JR C,02
D630          SUB 30           ;not too large
DD7702        LD (IX+2),A      ;new down position
DD7E01        LD A,(IX+1)      ;right position
DD8603        ADD A,(IX+3)     ;right speed
F25AA4        JP P,02
C650          ADD 50           ;ensure positive
FE50          CP 50
3802          JR C,02
D650          SUB 50           ;not too large.
DD7701        LD (IX+1),A      ;new right position
DD360800      LD (IX+8),00     ;clear collision flag
CD79A4        CALL WRISPR      ;write new sprite
110900   MOVEON LD DE,09
DD19          ADD IX,DE        ;check next sprite
DD7E00   CHKEND LD A,(IX+0)
1F            RRA              ;sprite on?
38B1          JR C,NEXSPR
1F            RRA              ;no more sprites?
30F2          JR NC,MOVEON
C9            RET
F5       WRISPR PUSH AF        ;save right position
D650          SUB 50
ED44          NEG
4F            LD C,A           ;room for sprite
DD6602        LD H,(IX+2)      ;down position
DD5E06        LD E,(IX+6)      ;shape data address
DD5607        LD D,(IX+7)      ;shape high byte
1A            LD A,(DE)        ;size of sprite
47            LD B,A           ;width
6F            LD L,A           ;height
13            INC DE
F1            POP AF           ;right position
E5       VERT PUSH HL
F5            PUSH AF
D5            PUSH DE
110000        LD DE,0000
F5            PUSH AF
7C            LD A,H           ;down position
FE30          CP 30            ;off screen bottom?
3802          JR C,02
D630          SUB 30
CB3F          SRL A            ;divide by two
3002          JR NC,02
1620          LD,20            ;middle of line
6F            LD L,A
2600          LD H,00          ;prepare to multiply
F1            POP AF
D5            PUSH DE
29            ADD HL,HL        ;times two
29            ADD HL,HL
29            ADD HL,HL
29            ADD HL,HL
E5            PUSH HL          ;sixteen times
D1            POP DE
29            ADD HL,HL
29            ADD HL,HL        ;times sixty four
19            ADD HL,DE        ;times eighty
D1            POP DE           ;half line offset
19            ADD HL,DE
16C0          LD D,C0          ;start of screen
5F            LD E,A           ;right position
19            ADD HL,DE        ;screen address
D1            POP DE           ;data address
3E04          LD A,04          ;four lines a block
F5       LINE PUSH AF
C5            PUSH BC          ;width parameters
E5            PUSH HL
1A       BYTE LD A,(DE)
FE00          CP 00
280C          JR Z,ZERO        ;ignore zero bytes
7E            LD A,(HL)        ;screen byte
FE00          CP 00            ;check collision
2803          JR Z,03
DD7708        LD (IX+8),A      ;collision flag
1A            LD A,(DE)        ;sprite byte
E6FF     MASK AND FF           ;pen mask
77            LD (HL),A        ;write screen
13       ZERO INC DE           ;next data
23            INC HL           ;next screen byte
0D            DEC C
2008          JR NZ,ROOM       ;room for sprite
D5            PUSH DE
AF            XOR A
115000        LD DE,0050
ED52          SBC HL,DE        ;start of line
D1            POP DE
10E0     ROOM DJNZ BYTE        ;next width byte
E1            POP HL
010008        LD BC,0800
09            ADD HL,BC        ;next screen line
C1            POP BC
F1            POP AF
3D            DEC A            ;four lines
20D3          JRNZ,LINE
F1            POP AF
E1            POP HL
24            INC H
2D            DEC L
20A2          JRNZ,VERT        ;next vertical block
C9            RET
D5       ERASE PUSH DE         ;data base address
21CAA4        LD HL,MASK+1
3600          LD (HL),00       ;clear pen mask
DDE1          POP IX
DD360000      LD (IX+0),00     ;turn sprite off
DD7E01        LD A,(IX+1)
C379A4        JP WRISPR
```

```
  1 REM ************************
  2 REM *   SPECTRUM RAMDISK   *
  3 REM ************************
  4 REM Acknowledgements to Ric
hard Taylor YC March 1985 for th
e
  5 REM method of redefining ba
sic words.
 100 DATA "ff8df8f3ed4bb45ced5b3
85c2a7b5cd93e00d3fe3e3fed472ab2"
 110 DATA "5c545d36002bbc20fad9e
d43b45ced53385c227b5cd9ed53b25c"
 120 DATA "21003c22365ceb363e2bf
92b2b223d5c21b65c224f5c11af1501"
 130 DATA "1500ebedb0eb2b22575c2
322535c224b5c36802322595c360d23"
 140 DATA "36802322615c22635c226
55c3e07328d5c328f5c32485c212305"
 150 DATA "22095cfd35c6fd35ca21c
61511105c010e00edb0fdcb01cecddf"
 160 DATA "0efd363102fbcd6b0daf1
11ff9cd0a0cfdcb02ee18198052414d"
 170 DATA "444f53207f20526f20313
938358dfd363102cd9517cdb016afcd"
 180 DATA "0116cd2c0fcd94fafdcb0
07e202cfe5c20163a3a5cfe0b200f21"
 190 DATA "45f9e521ddfae5fd3600f
fc37dfbfdcb306628402a595ccda711"
 200 DATA "fd3600ff18c42a595c225
d5ccdfb1978b1c242fadffe0d28a7fd"
 210 DATA "cb3046c4af0dcd6e0d3e1
9fd964f328c5cfdcb01fefd3600fffd"
 220 DATA "360a01cdf0fa76fdcb01a
efdcb304ec4cd0e3a3a5c3cf5210000"
 230 DATA "fd363702fd7426220b5c2
322165ccdb016fdcb37aecd6e0dfdcb"
 240 DATA "02eef147fe0a3802c607c
def153e20d778119113cd0a0caf1136"
 250 DATA "15cd0a0ced4b455ccd1b1
a3e3ad7fd4e0d0600cd1b1acd97103a"
 260 DATA "3a5c3c281dfe092804fe1
52003fd340d01030011705c21445cfd"
 270 DATA "cb0a7e280109edb8fd360
afffdcb019ec33bf93e10010000c3bb"
 280 DATA "f9ed43495c2a5d5ceb213
afae52a615c37ed52e56069cd6e1920"
 290 DATA "06cdb819cde819c1793db
02828c5030303032bed5b535cd5cd55"
 300 DATA "16e122535cc1c5132a615
c2b2bedb82a495cebc1702b712b732b"
 310 DATA "72f1c331f9fdcb01becdf
b19affd770d3dfd77001801e7cdbf16"
 320 DATA "fd340dfa8a1cdf0600fe0
d2864fe3a28eb21ddfae54fe779fefa"
 330 DATA "ca62fbfeeaca19fbfee6c
a70f8fefdca2efffe2ac2441bc37dfb"
 340 DATA "cd541fd27b1bfdcb0a7e2
06c2a425ccb7c281421feff22455c2a"
 350 DATA "615c2bed5b595c1b3a445
c1834cd6e19fd7e0a281aa7c2ec1b47"
 360 DATA "7ee6c078280fcfffc1cd3
025c82a555c3ec0a6c0affe01ce0056"
 370 DATA "235eed53455c235e2356e
b192322555ceb225d5c571e00fd360a"
 380 DATA "ff15fd720dcaa5fa14cd8
b192802cf16dffe0d28c0fe3acaa5fa"
 390 DATA "c38a1ccd821cdffecbc28
a1cc1cd30252809ef0238ebcde93438"
 400 DATA "a0c3a5fadf0600fe73286
4fe6c285ffe6d2859fe642854fe7428"
 410 DATA "4ffe632835fe78ca10fff
e66ca5dfdfe65281cc38a1c00000000"
 420 DATA "00000000000000000000
000000000000000000000e7cdee1b21"
 430 DATA "6df8226ef8c9fd363a06e
7cdee1bcd3025c8011300f7d5dde1c3"
 440 DATA "11fd0404040404fd703ae
7cd8c1ccd30252834012400f7d5dde1"
 450 DATA "060b3e20121310fcdd360
1ffcdf12b21f6ff0b0903300ffd7e3a"
 460 DATA "a72002cf0e78b1280a010
a00dde5e123ebedb0fd7e3afe052021"
 470 DATA "dfcdee1bed5b6ef8dd730
ddd720e214effaffd773aed52dd750b"
 480 DATA "dd740cebc31007dffeaa2
01ffd7e3afe03ca8a1ce7cdee1bdd36"
 490 DATA "0b00dd360c1b210040dd7
50ddd740e184dfeaf204ffd7e3afe03"
 500 DATA "ca8a1ce7cd4820200cfd7
e3aa7ca8a1ccde61c180fcd821cdffe"
 510 DATA "2c200cfd7e3aa7ca8a1cc
de61c1804e7cd821ccdee1bcd991edd"
 520 DATA "710bdd700ccd991edd710
ddd700e6069dd360003184 4feca2809"
 530 DATA "cdee1bdd360e801817fd7
e3aa7c28a1ce7cd821ccdee1bcd991e"
 540 DATA "dd710ddd700edd3600002
a595ced5b535c37ed52dd750bdd740c"
 550 DATA "2a4b5ced52dd750fdd741
0ebe5011100dd092a6ef8011100dde5"
 560 DATA "d1edb0dd7511dd7412fd7
e3afe0620583efecd0116dd7e00fe04"
 570 DATA "383a3e0dd72a6ef8ed4bb
25caff5ed42444dcd2b2dcde32d1151"
 580 DATA "fdc3220c2042797465732
0667265658de7cdee1b3e02cd0116cd"
 590 DATA "1a1f21ffff3f18d011c00
9cd0a0cdde5d1060a131ad710fb1837"
 600 DATA "0e80dd7e00ddbeef20020
ef6fe04380afd7e3aa7ca94fee1cf07"
 610 DATA "dde5d121f0ff19060a7e3
c200379804f131abe2320010c10f7cb"
 620 DATA "792810dd460cdd4e0bdd6
e11dd661209c314fdfd7e3aa720272a"
 630 DATA "6ef8dd5e0bdd560c19dd5
efadd56fb7ab32811ed52ed5bb25ced"
 640 DATA "52dab1fecde4fec394fee
1c9e147fe04cae4fedd7e00fe032808"
 650 DATA "783dca32fec3ccfee5dd6
efadd66fbdd5e0bdd560c7cb5e17cb5"
 660 DATA "2006dd6e0bdd660e424b5
45ddd6e11dd6612edb0c9dd5e0bdd56"
 670 DATA "0ce5dd6efadd66fbeb37e
d5238091105001944 4dcd051fe1eb2a"
 680 DATA "595c2bdd225f5cdd4e0bd
d460cc5cde519c1e5c5cd5516dd2a5f"
 690 DATA "5c23dd4e0fdd461009224
b5cdd660e7ce6c0200add6e0d22425c"
 700 DATA "fd360a00c1dd6e11dd661
2d1edb0c92a6ef8dd5efadd56fb7ab3"
 710 DATA "caf3fded52011100ed42e
d5bb25ced523002cf0319ebdde5e137"
 720 DATA "ed4223ed536ef8edb0dd4
efadd46fbe1edb0c9dd4e0bdd460cc5"
 730 DATA "03f73680c1d5dd6e11dd6
612edb0c3cd08dd5e11dd56121bdd6e"
 740 DATA "0bdd660c19e5eb011100a
7ed42ed5b6ef8e52323ed52444de1d1"
 750 DATA "edb81313ed536ef8c9cd7
91ccdee1bcd991e036069cd6e19e5cd"
 760 DATA "991e6069cd6e19d1ebcde
519c9dfcdde1ccdee1bcd991e78b120"
 770 DATA "04ed4bb25c2a6ef8a7ed4
2dab1fec3b71ec900000000000000000"
 800 DATA 43367,45632,26003,2409
7,23479,45337,35906,39309,30286,
44616
 802 DATA 50490,49745,36529,4480
4,31570,31130,26450,39055,40367,
36652
 804 DATA 36384,44158,54794,6025
1,35216,35731,44085,29281,49845,
42930
 806 DATA 42556,34171,17042,4965
4,40572,36841,41845,46800,48311,
38452
 808 DATA 44963,46860,33246,4564
6,37411,37499,39522,42336,38070,
34530
 810 DATA 48885,29610,36304,5057
6,50900,55095,44303,35093,45869,
32393
 812 DATA 56766,46065,54500,4351
2,47049,46401,49525,27934
 820 DATA 2774606
 999 DEF FN v(x)=x-48-(39 AND x>
96)
1000 CLEAR 32000
1005 LET a=63597: DIM a(68): LET
 f=0
1008 RESTORE 800: LET c=0: FOR i
=1 TO 68: READ a(i): LET c=c+a(i
)
1012 NEXT i: READ v
1014 IF c<>v THEN PRINT "Error i
n check lines 800 to 820": STOP
1015 FOR i=100 TO 770 STEP 10
1020 PRINT AT 0,0;i: RESTORE i:
LET c=0: READ a$
1030 FOR n=1 TO 51 STEP 2: LET v
=FN v(CODE a$(n+1))+16*FN v(CODE
 a$(n))
1035 LET c=c+v*(n+1)/2: POKE a,v
: LET a=a+1: NEXT n
1050 IF a(i/10-9)<>c THEN PRINT
"Error in line ";i: STOP
1060 NEXT i
1080 PRINT "No errors found"
```

RA

Ro Richardson with a piece of software to allow fast loading on your Spectrum.



THIS PROGRAM lets you load and save programs and code very fast without any extra hardware. It does this by using Ram to make a Ramdisc and by defining new Basic commands to access the disc. The new commands are kept as similar to the Spectrum's as possible, though many have no direct counterpart in the tape system.

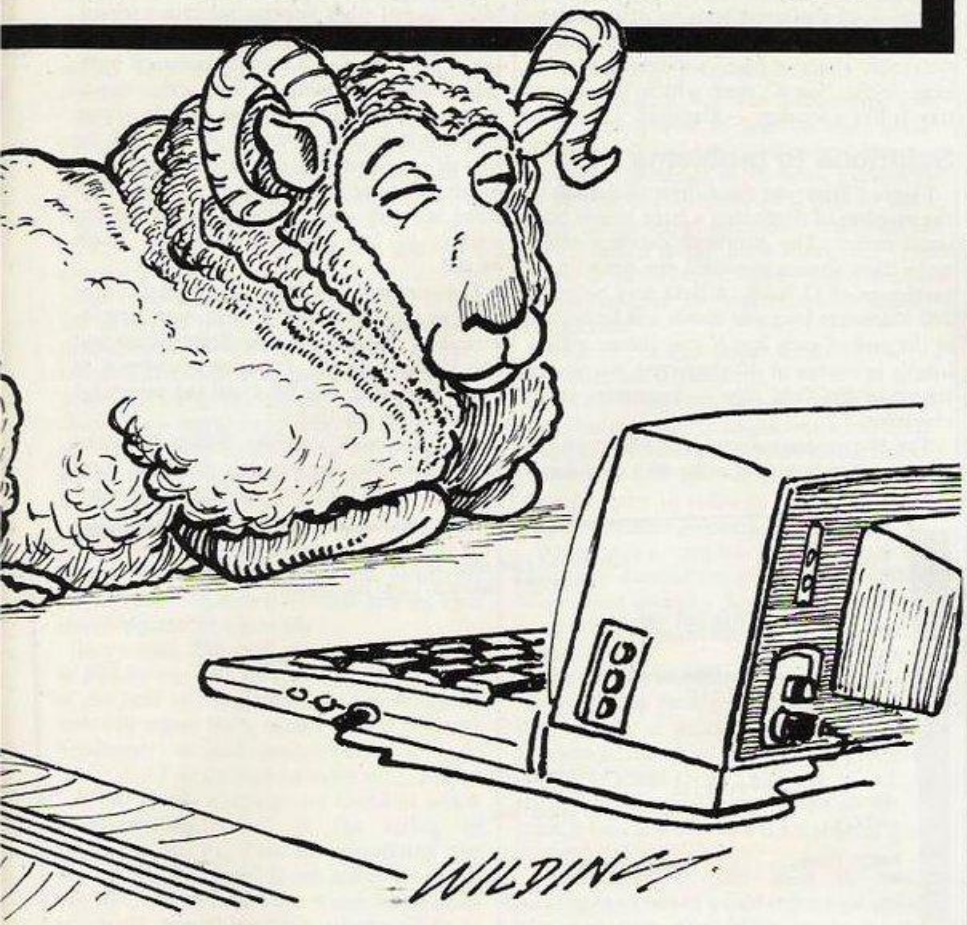
There is no limit to the number of files that can be saved on the disc, but there is a limit to the total size of stored files. The Ramdisc usually stores about 33K but this depends on where you put Ramtop — by Clearing. Each file is stored with a 17 byte header as in the tape system.

To use the Ramdisc, type in the hex loader — listing 1 — Save it on tape and Run it. The data has checksums so any errors should be spotted. Once it runs type

RANDOMIZE USR 63600

to switch the new commands on. A Ramdos — Ramdisc operating system — logo should now appear on the bottom of the screen. The new commands are now active. You can use any Basic command without interfering with the Ramdos. As the whole system is above Ramtop, you can use New without losing the files

MDISC



stored. The easiest way to save code to tape is with the *t command — see later.

All commands consist of an asterisk followed by a lower case letter, possibly followed by parameters.

l Load — must be followed by a file name as a string up to 10 characters. If file name is null (" ") then the most recently saved file of the correct type — program or code — will be loaded. Options Screen$ and Code are provided and are exactly the same as the tape versions. Data is not available.

s Save — must be followed by a file name. The name may not be null. Options Code, Screen$ and Line are provided and are the same as the tape versions. Data is not supported, but programs are saved with their variables. When a file under the same name — and type — is already on the disc, it is overwritten. The file is also moved to the top of the disc.

m Merge — only works with program files, works the same as the tape version.

d Delete — must be followed by a file name. You must specify Code to delete a code file. If the file name is null then the most recently saved file is deleted.

c Catalogue — has no parameters. It prints a list of all files on the disc in exactly the same way as Load prints file names for the cassette system. It also prints the number of available bytes on the Ramdisc.

e Erase — erases the whole Ramdisc.

t Tape — must be given a file name. It saves all the files on the Ramdisc and the Ramdisc operating system to tape as a standard code file. This means that you can save and load a whole environment in one chunk of code. To load the file from Basic,

```
CLEAR 30000
```

or whatever value you are using,

```
LOAD "" CODE
```

and then

```
RANDOMIZE USR 63600
```

to switch the new commands on.

f Free — prints the number of bytes free in the Basic system, ie. below Ramtop. You may need this value when deciding where to place Ramtop. To get the total available space in the machine add this value and the value from catalogue (*c).

x Block delete — deletes all Basic lines in the given range including the start and end lines. It is not strictly a Ramdos command, but is a very short routine and should be useful.

In addition the New command has been redefined to print the new logo, and the Clear command now checks that the new value of Ramtop will not cause the Ramdisc to be overwritten. In cases where this would occur, the report "Out of memory" is given.

Error conditions and messages.

4 Out of memory — occurs when saving to the Ramdisc when there is not enough space for the new file. The area to be reclaimed if the file already exists is taken into account, so deleting the old copy will have no effect. Try moving Ramtop down by Clearing. If it occurs during loading or merging then there isn't enough space in the Basic area for the program.

8 End of file — occurs when loading, merging or deleting a file which does not exist — ie. the end of directly had been found without finding the file. Sometimes occurs because you leave out the Code when loading bytes.

The value of Ramtop splits the available Ram into space for Basic and space for Ramdisc. A value of 30000 gives Basic reasonable space and leaves 34K for the Ramdisc. If you Clear too low Basic will reject your Ramtop, and if you Clear too high you will get the "Out of memory" error.

The method used for redefining commands consists of two pieces. First, a copy of the kernel of the Rom is made in Ram. The idea is that control will stay in the Ram, just calling Rom routines when required. There is one snag, the Rom routine check-end 1BEE throws away it's return address. To overcome this some code is inserted in the error routine in case new commands fail the syntax check.

Once this is done it is easy to define new commands, and I have left 25 bytes free in the jump table in case you want to add some. Disassemble from 64381, and move the instruction at 64422 down to accommodate your commands. If you don't like the default colours of white on black,

```
POKE 63714
```

with the attributes you want.

The main use of this system will probably be for small Basic programs under development, and for keeping utility programs handy. It also enables you to load and save screens very quickly, although you are limited to about four screens. There are other not so obvious uses though.

After I had written the program I still had the problem of generating the hex dump data statements. It is easy to print what looks like a program listing, but then you can't edit or run it.

I wrote a Basic program to poke the Data statements together with line numbers, line lengths and trailing Enter bytes into unused memory — just above Ramtop — then saved this as a code file on Ramdisc, poked around with the header to change it to a program, then loaded the program.

If you want to have other machine code in the machine you could put it in the printer buffer or UDG area if it is small enough. If it is too big you could put it just above Ramtop, and keep a careful watch on your Ramdisc size, or save a dummy chunk of code to reserve an area in the Ramdisc. ■

DATABA

John Dawson completes his series on databases with a look at recent developments.

THE FIRST TWO articles in this series examined how the structure of different databases makes them more or less suitable for different purposes, how information can be extracted from the database and how insecure all of the BBC databases really are despite the password "protection" offered in some of the packages.

This month I'll conclude the series by writing about recent developments to the Merlin database, the design of the input forms in all the programs and the miscellaneous conclusions that come out of using a database program for some time.

Merlin database, the program from Merlin Computer products in Swansea, now has a sort program for ordering the records into a particular sequence on disc. The Report Writer language has also been finalised and you can construct quite sophisticated high level programs for taking information from a file, manipulating it — by adding VAT to the price of an item in a stock list for example — and then printing the result — as an invoice — or by writing the result of the calculation back to the same, or another field in the record.

The command set

Figure 1 shows two of the sample Report Writer programs given names and telephone numbers in a neat, tabulated format in which the tab stops are set within the program. Commands must be preceded by a colon, labels — for Repeat, Gosub and Goto purposes — by a full stop and remarks by an asterisk.

The second example will extract data from the Inv Value, VAT%, Discount and Payment fields and write back to the record the values of Net Inv — net invoice — and Acc Bal — account balance. A label printing program is supplied that will print as many labels across the page as you need — Stardatabase is the other database that will print labels more than one wide.

The command set for the Report Writer program is as follows:

ADD a record	DISC (ON/OFF)
FGET S(x)	END FORM feed to printer
GET S(x)	FINPUT [F(x), S(x)]
GOTO label	GOSUB label
INFILE "filename"	IF condition THEN
MOVE [F(x), S(x)FIELD]	INPUT [F(x), S(x)]
PTR F(x)	OUTFILE "filename"
READ a record	PRINTER (ON/OFF)
RETURN from a subroutine	REPEAT
STRLEN number	SCREEN (ON/OFF)
UNTIL condition	TRUNCATE (ON/OFF)
WRITE a record back to the database	

Arithmetic and logical operators and a subset of Basic mathematical functions such as SQR, ABS and INT. Many of the commands are similar to Basic instructions and it shouldn't prove difficult to use the Report Writer provided that it is adequately backed up by a good instruction manual.

All the programs use screen Mode 7 for entering information. Three of the databases overcome the limitations of the Mode 7 format — 40 characters wide by 25 lines deep — by offering either multiple input screens — Acornsoft and the Merlin database — or a large input "card" over which the screen travels like a window — Datagem.

Solutions to problems

Figure 2 illustrates the different solutions to the problem of displaying a large record on a small screen. The Acornsoft database offers up to three screens on which you can set up a maximum of 32 fields. A field may be up to 240 characters long and words will be broken at the end of each line if you choose a field length in excess of 40 characters minus the length of the field title — maximum seven characters.

The Merlin database program allows you to allocate up to four screens for each record and the appropriate screen will be shown on the VDU as you enter information into a record. In other words the program will place the cursor at the start of each field in numerical order which may mean jumping from screen one to screen three, screen two and back to screen one if that is the convenient or easy way for you to enter data. Stardatabase is limited to a single screen of 920 characters and long field titles will encroach even further on to the amount of data you can store in a single record.

Datagem will let you set up a field that is as wide as the input card. A field must be contained on one line but, like Stardatabase and the Merlin database, Datagem allows you to place more than one field and the associated field title on one line.

The Acornsoft database differs from the other three programs in that the input form requires each field title to start at the left

Figure 1.

```
*                          CALCULATION AND WRITE BACK REPORT
*                              REPORT SOURCE LISTING REP3
*
:SCREEN ON :PRINTER ON
:REPEAT:F(0)=0:F(2)=0
:READ
:MOVE F(0),NET INV:MOVE F(2),ACC BAL
:MOVE INV VAL,F(1)
:MOVE VAT,F(3)
:MOVE PAYMENT,F(4)
:MOVE DISC,F(5)
:F(0)=F(1)*(1+(F(3)/100))*((100-F(5))/100)
:F(2)=F(2)-F(4)+F(0)
:MOVE F(0),NET INV:MOVE F(2),ACC BAL
:WRITE
*
$NET INV$...        $ACC BAL$...
*


:UNTIL EOF
*
* NOTE THE USE OF THE WRITE COMMAND TO UPDATE THE NET INVOICE AND ACCOUNT
* BALANCE VALUES.
* NOTE ALSO THAT THE USE OF THE WRITE COMMAND DICTATES THAT THE DATABASE
* MUST BE RESTRUCTURED BEFORE FURTHER EDITING CAN TAKE PLACE.
*       E X A M P L E   O F   S I M P L E   T A B U L A T I O N   R E P O R T
*
:SCREEN ON :PRINTER ON
:REPEAT
+-----------------------------------------------------------------------------+
!  No.   ! Name                          ! TEL  ! Inits  !  DATE  !           !
+-----------------------------------------------------------------------------+
:REPEAT :READ :F(0)=F(0)+1
!$F(0)6$ ! $Name$.............!$TEL$.!$inits$.!$DATE$..! $COMMS$.............!
:UNTIL LINE > 200R EOF
+-----------------------------------------------------------------------------+
:FORM:UNTIL EOF
*
*                          ==========================
* NOTE THE USE OF A '*' AS A REM STATEMENT. I.E. ANY TEXT PRECEDED BY AN
* ASTERISK IN COLUMN 1, WILL BE IGNORED BY THE REPORT WRITER ON PRINTOUT.
*
* DO NOT USE A RETURN MARKER ALONE IN A LINE UNLESS YOU INTEND THAT A LINE
* FEED SHOULD BE SENT TO THE PRINTER.
*
* USE '*' IN COLUMN 1 TO SEPARATE GROUPS OF PROGRAM COMMANDS OR TEXT ON
* SCREEN WHEN MORE READABILITY IS WANTED
*
* ALWAYS INSERT A RETURN AT THE END OF EACH LINE. IF WORD WRAP OCCURES
* GO BACK AND INSERT THE RETURN OR THE LINE WILL BE OVERPRINTED.
* I.E. NO LINE FEED COMMAND IS SENT BY WORD WRAPPED TEXT. ALTERNATELY
* IF YOU NEED PRINTOUT LONGER THAN 80 COLUMNS WORD WRAPPED TEXT WILL
* PRODUCE IT.
```

SES

margin. The result of the more flexible approach taken by the more expensive programs is that you can simulate an existing paper record, with which people may be familiar already.

Despite the simple input capability of the Acornsoft database it is effective and easy to use. When you remember the limitations of View in terms of using long fields as "macros", this database offers all you will need for storing names, addresses and other non-textual data.

Stardatabase treats the field with the lowest ASCII code as the keyfield. This means that a field identified by the field tag Address1 has a lower ASCII value than a field tag Name or Address2. Figures come before alpha characters — upper and lower case letters — in the ASCII table and you can force the program to treat the Name field tag as the keyfield by calling it Oname.

Using easily identifiable field names is important because Stardatabase expects you to know the field name — not the field title displayed on the screen — when you set up a search pattern or a sort list.

In contrast, Datagem permits you to search or sort on any field by specifying the number of the field in the search line. The following line will search for a named person "George Sanderson" in field number one:

F1 = "George Sanderson"

If one or more records are found in which "George Sanderson" is the string of characters in F1, markers identifying the records will be placed in the search level that you have selected. You can search for an exact match or something that approximates to what you are looking for in one or all the fields in the database using the search line:

F£ = "£ander£"

where the left hand F£ searches all the fields and the right hand expression will find the string "ander" in Mander, Sanderson, Anderson, Landerfield and so on. Datagem has the most powerful search facilities of all the databases I have examined and while Datagem is not the speediest database when it is actually calculating and computing, it gains heavily in terms of the time it will take you to formulate your search and carry it out.

Searching a record set

In other words the design of Datagem, far from perfect as it is, more than makes up for its comparatively leisurely performance in this area. Curiously, the Acornsoft database seems to me to be the next most useful program in terms of ease of searching a set of records. There is no multiple level search facility in the Acornsoft program but the fuzzy search facilities are a good match for those in Datagem. Sx makes you carry out serial searches, progressively refining a subset of records from the main database, until you arrive at the specification that you require.

There is no real disadvantage in this method but Sx has been so precisely designed that the repeated operations become tedious. Remember that this is the database that I have chosen for routine use at work because it provides the optimum performance for the tasks that I wish to have done on the BBC computer.

I do wish, however, that the designer of Sx had studied the humans who use his program. In their sloppy way they want to simply find someone or something as quickly as possible with as few keystrokes as possible.

Having to go to the Search sub-menu, clear the current subset to zero records, decide which field the person or object will occur in, remember the names of the fields without being able to display them on screen — was it Key or Keywords or Keyword — carry out the search, return to the main menu and select browse or amend mode before finally displaying the required information is unnecessarily complicated.

Datagem can also export data to View and Wordwise but if you want to insert the name of a book, a sentence or some other information that may vary in length into a line of text I think you would have to spool the completed printout to disc and then load it back into View in order to reformat the text before it could be printed properly.

Datagem is a complete package which contains little information about the possibilities of accessing data in a database using any program other than the facilities in the program Rom.

The Merlin database has a sophisticated report writing package available on disc and this method of producing software — core program in Rom and utilities and extensions on disc — seems to offer a very good combination. The Report Writer section of the program is new and will take some time to access in depth.

Nevertheless, if you need to handle paragraphs of text in a card index type of database, and if you need to set up routine searches that lead to predetermined and complex reports then the Merlin database may be just what you are looking for. Certainly none of the others will fill these needs as well.

Sx has several attractive features. The program is supplied with information about a large number of very useful procedures and "Star" calls for accessing the data in a Sx file. At the same time you should be aware that the Basic software supplied with the Sx chip is not error free.

If you try to add a page header to a report form from disc you are rewarded with a persistent error message. Other combinations of circumstances cause the utility software to hang up, but at least it is written in common or garden Basic and you can have a crack at correcting it, or modifying it to your particular needs.

Set against that, the Report Writer language for the Merlin package is compiled and enables you to produce a reporting program that cannot be easily deciphered by users who purchase a system from you.

Datagem has the best financial facilities of all the packages and Sx has potentially the worst because it handles all numbers as strings, rather than integers or real numbers, and, consequently, has no data validation. Additionally, Sx won't even search on the full six figures needed to describe a unique data in the twentieth century.

Data manipulation

You will need to read the Datagem manual carefully to appreciate the potential that it has for sophisticated numerical data manipulation. You will need to read the Datagem manual carefully to get much information from it. Written by the author of the program and one other person, it is a masterpiece of compact information leading to subtle confusion.

In all the discussion about the expensive systems it is very easy to overlook the cheap but capable Acornsoft package; probably for just that reason — it's cheap. If you can cope with seven letter field titles, a very slow sort function, the limitations of data export to View — shared with other database programs — and the obvious problems of swapping program and data discs if you have only one disc drive, then the Acornsoft program offers stunningly good value for money.

The data on a disc is organised in such a way as to make it accessible to Basic programs, the search facilities are good, the manual is far more helpful than those supplied with the View wordprocessor and it's a pleasant and effective package to use. ■

Figure 2. Datagem — Data input card.

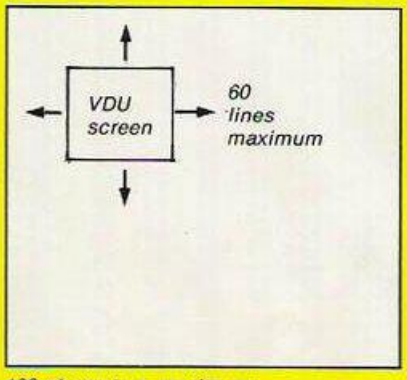
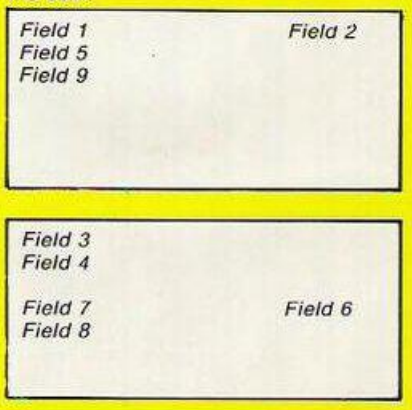


Figure 2a. Merlin DataScribe database. Multiple input screens with fields placed in the order of input most convenient to the user.

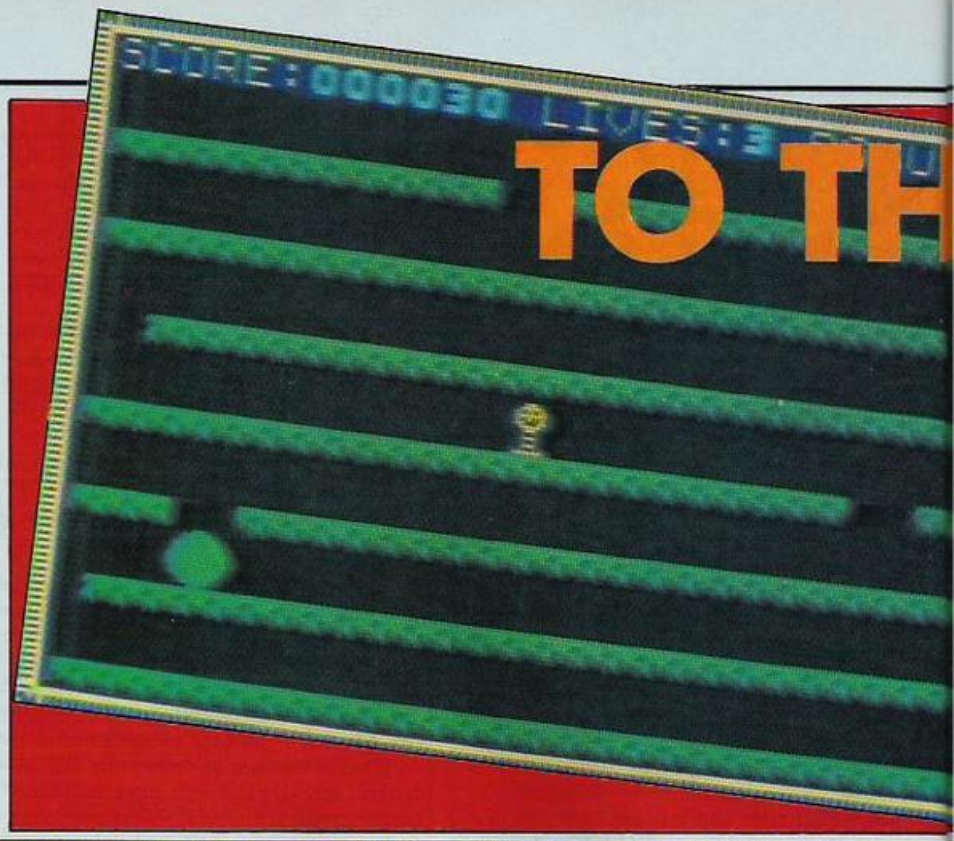


TO THE TOP is a game for the 48K Spectrum, featuring smooth animated sprite graphics, music, continuous sound, and a high score table. The object of the game is to move your man to the top-right hand side of the screen as quickly as possible, guiding him through the holes in the moving platforms which become faster the higher he gets.

However, he is not alone. To accompany him are various moving objects whose touch is lethal. On the first screen, there is only a rotating ball — which moves down the screen by falling through the platforms — to contend with but, on further levels, he is joined by several other characters, including a Pacman, a space invader and a beefburger in baps. These all move across the screen from left to right, gradually working their way down.

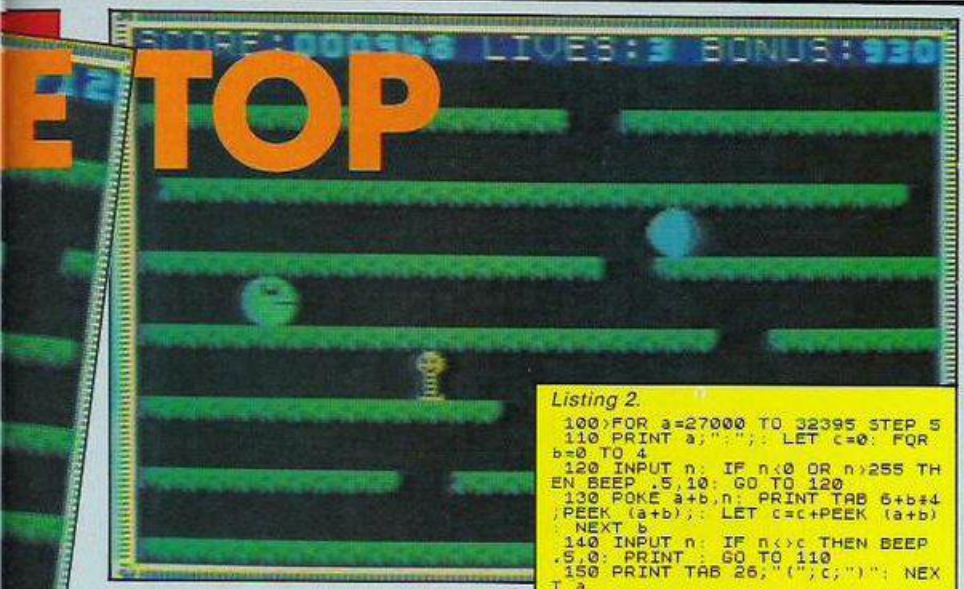
In order to speed you up a bit, there is a bonus which decreases as time passes. What is left of your bonus on completion of a screen is added to your score. If you can ever complete the first seven levels with your three lives — surely this isn't possible? — a congratulatory tune is played, you get an extra life, and the game goes back to the first screen, with faster moving platforms.

The control keys for the game are given in the instructions in the game, but note that, to



Listing 1.

```
27000:1   24  252 205 140 (622)
27005:105 1   156 255 205 (722)
27010:140 105 14  246 205 (710)
27015:140 105 125 24  8   (402)
27020:62  255 9   60  56  (442)
27025:252 237 66  205 238 (998)
27030:105 201 17  0   0   (323)
27035:14  7   205 221 105 (552)
27040:42  0   91  56  2   (193)
27045:91  1   16  39  25  (172)
27050:237 66  56  6   60  (425)
27055:50  2   91  24  1   (166)
27060:9   235 6   255 38  (543)
27065:0   111 205 132 105 (553)
27070:235 34  0   91  205 (565)
27075:120 105 201 14  20  (460)
27080:205 221 105 56  3   (592)
27085:91  254 10  220 238 (813)
27090:105 201 14  20  205 (553)
27095:221 105 205 126 105 (762)
27100:201 62  77  50  143 (533)
27105:92  6   1   205 26  (330)
27110:106 201 217 1   0   (525)
27115:60  24  5   217 237 (543)
27120:75  123 92  237 91  (616)
27125:132 92  38  0   111 (373)
27130:41  41  41  9   122 (254)
27135:15  15  15  230 3   (276)
27140:246 68  71  75  58  (538)
27145:143 92  2   6   8   (251)
27150:126 18  20  35  16  (215)
27155:250 33  132 92  52  (559)
27160:217 201 229 120 15  (782)
27165:15  15  230 224 177 (661)
27170:111 120 230 24  246 (731)
27175:64  103 34  132 92  (425)
27180:225 201 33  0   64  (523)
27185:62  68  54  0   35  (239)
27190:188 32  250 62  91  (623)
27195:113 35  188 32  251 (619)
27200:201 211 254 50  72  (788)
27205:92  201 62  1   230 (594)
27210:24  211 254 79  229 (797)
27215:43  124 181 32  251 (631)
27220:225 27  122 179 121 (674)
27225:32  238 201 26  254 (751)
27230:255 200 254 33  32  (774)
27235:7   19  26  50  143 (245)
27240:92  24  25  48  19  (209)
27245:79  19  26  254 33  (411)
27250:56  6   205 136 106 (509)
27255:27  24  11  71  205 (338)
27260:26  106 24  5   214 (375)
27265:34  205 238 105 19  (601)
27270:24  212 42  132 92  (502)
27275:120 6   0   9   71  (206)
27280:34  132 92  201 1   (460)
27285:1   0   205 26  106 (338)
27290:6   30  62  24  205 (327)
27295:238 105 16  249 6   (614)
27300:23  205 26  106 6   (366)
27305:30  62  31  205 238 (566)
27310:105 16  249 6   1   (377)
27315:14  0   205 26  106 (351)
27320:62  30  205 238 105 (640)
27325:14  30  205 136 106 (491)
27330:62  29  205 238 105 (639)
27335:4   120 254 24  32  (434)
27340:230 17  212 106 205 (770)
27345:92  106 201 0   0   (399)
27350:61  30  59  0   23  (173)
27355:62  30  60  33  57  (242)
27360:255 217 33  121 92  (718)
27365:94  52  22  4   26  (198)
27370:43  134 230 87  198 (632)
27375:2   217 201 30  4   (454)
27380:33  29  91  123 50  (326)
27385:143 92  14  1   67  (317)
27390:205 26  106 6   30  (373)
27395:62  22  205 238 105 (632)
27400:16  249 67  123 198 (653)
27405:3   95  254 25  200 (577)
27410:205 225 106 79  13  (628)
27415:13  7   7   7   119 (153)
27420:205 26  106 62  23  (422)
27425:205 238 105 62  23  (633)
27430:205 238 105 35  24  (607)
27435:207 62  1   205 65  (540)
27440:106 14  0   205 46  (371)
27445:106 205 242 106 17  (676)
27450:79  107 205 92  106 (589)
27455:205 148 106 205 198 (862)
27460:105 205 152 105 205 (772)
27465:212 105 205 149 108 (779)
27470:201 1   1   33  78  (314)
27475:44  45  46  47  48  (230)
27480:49  6   57  50  51  (213)
27485:52  48  44  49  43  (236)
27490:57  53  46  55  54  (265)
27495:44  49  33  78  255 (459)
27500:33  27  91  78  121 (350)
27505:60  254 7   32  2   (355)
27510:62  1   119 35  126 (343)
27515:6   4   35  31  220 (296)
27520:137 107 4   4   4   (256)
27525:13  32  245 201 245 (736)
27530:126 15  15  15  230 (401)
27535:31  197 79  120 15  (442)
27540:15  15  230 224 177 (661)
27545:95  120 230 24  246 (715)
27550:64  87  126 230 7   (514)
27555:71  62  7   144 71  (355)
27560:175 55  23  16  253 (522)
27565:61  205 211 107 71  (655)
27570:121 254 3   229 33  (640)
27575:28  0   56  3   33  (120)
27580:254 255 25  235 225 (994)
27585:120 47  205 211 107 (690)
27590:193 126 60  60  254 (693)
27595:248 32  2   62  8   (352)
27600:119 241 201 213 217 (991)
27605:79  209 122 15  15  (440)
27610:15  230 3   246 88  (582)
27615:103 107 54  4   33  (301)
27620:60  121 6   8   126 (321)
27625:161 18  20  35  16  (250)
27630:249 121 217 201 237 (1025
27635:91  123 92  111 38  (455)
27640:0   41  41  41  25  (148)
27645:235 221 78  1   221 (756)
27650:70  2   197 205 44  (518)
27655:108 193 221 117 3   (642)
27660:221 116 4   33  240 (614)
27665:255 25  235 12  121 (648)
27670:254 31  32  12  14  (343)
27675:1   4   4   4   120 (133)
27680:254 20  32  2   6   (314)
27685:2   221 113 1   221 (556)
27690:112 2   120 15  15  (264)
27695:15  230 224 177 111 (757)
27700:120 230 24  246 64  (684)
27705:103 229 6   8   26  (372)
27710:119 36  19  16  250 (440)
27715:1   32  248 9   235 (525)
27720:1   8   0   9   235 (253)
27725:65  26  119 36  19  (265)
27730:16  250 37  124 15  (442)
27735:15  15  230 3   246 (509)
27740:88  103 221 126 0   (538)
27745:119 1   224 255 9   (608)
27750:119 225 201 221 110 (876)
27755:3   221 102 4   175 (505)
27760:6   8   119 36  16  (185)
27765:252 1   32  248 9   (542)
27770:6   8   119 36  16  (185)
27775:252 201 33  26  91  (603)
27780:126 203 127 40  2   (498)
27785:62  252 198 4   254 (770)
27790:12  32  2   62  132 (240)
27795:119 201 221 33  37  (811)
27800:91  237 75  8   91  (502)
27805:120 254 0   200 17  (591)
27810:20  2   205 225 106 (558)
27815:230 3   198 67  221 (719)
27820:119 0   205 225 106 (655)
27825:221 119 1   221 114 (676)
27830:2   20  20  20  123 (185)
27835:198 12  95  217 205 (787)
27840:242 107 17  5   0   (371)
27845:221 25  217 16  218 (697)
27850:201 33  26  91  54  (405)
27855:0   35  54  1   35  (125)
27860:54  254 62  4   50  (424)
27865:36  91  33  140 120 (420)
27870:34  123 92  33  118 (400)
27875:92  54  5   35  54  (240)
27880:0   33  231 3   34  (301)
27885:4   91  175 50  14  (334)
27890:91  33  102 91  54  (371)
27895:1   35  54  0   35  (125)
27900:205 225 106 230 3   (769)
27905:198 4   119 35  54  (410)
27910:8   35  54  16  35  (148)
27915:54  1   33  22  91  (201)
27920:54  7   35  54  0   (180)
27925:33  124 160 34  24  (375)
27930:91  205 44  107 205 (652)
27935:173 110 205 19  112 (619)
27940:243 62  40  237 71  (653)
27945:237 94  253 33  19  (636)
27950:91  253 54  0   0   (398)
27955:251 205 108 107 42  (713)
27960:6   91  235 253 126 (711)
27965:0   183 192 42  24  (441)
27970:91  1   238 16  167 (513)
27975:237 66  200 235 43  (781)
27980:124 181 32  234 24  (595)
27985:226 33  36  91  53  (439)
27990:194 177 109 54  5   (539)
27995:205 129 108 230 127 (799)
28000:198 20  79  58  9   (364)
28005:91  183 200 71  221 (766)
28010:33  37  91  197 205 (563)
28015:105 108 193 121 198 (725)
28020:12  79  197 205 242 (735)
28025:107 1   5   0   221 (334)
28030:9   193 16  235 201 (654)
28035:33  120 92  53  1   (299)
28040:254 223 237 120 203 (1037)
28045:71  192 237 120 203 (823)
28050:71  40  250 175 211 (747)
28055:254 60  230 7   111 (662)
```



Julian Wood climbs to success by avoiding invaders and a beefburger in baps.

Listing 2.

```
 100>FOR a=27000 TO 32395 STEP 5
 110 PRINT a;":";: LET c=0: FOR
b=0 TO 4
 120 INPUT n: IF n<0 OR n>255 TH
EN BEEP .5,10: GO TO 120
 130 POKE a+b,n: PRINT TAB 6+b*4
;PEEK (a+b);: LET c=c+PEEK (a+b)
: NEXT b
 140 INPUT n: IF n<>c THEN BEEP
.5,0: PRINT : GO TO 110
 150 PRINT TAB 26;"(";c;")": NEX
T a
```

Listing 3.

```
  10>PAPER 0: INK 0: BORDER 0: C
LEAR 25000: PRINT PAPER 1; INK 7
; BRIGHT 1; FLASH 1;AT 11,4;""TO
 THE TOP" IS LOADING"
  20 LOAD ""CODE : RANDOMIZE USR
 29397
```

make things a little less impossible, your man has the advantage of a wrap-around screen.

To enter the game, first type in the machine-code loader in listing 23, with which you can enter all the machine code in listing 1. With listing 1, in the left-hand column are the memory address, and in the right hand column are the checksum values. Enter the five codes in between, and then the checksum value for that line.

If you have made a mistake in entering the line, a tone will sound, and you will have to enter that line again. If you enter a hopelessly wrong value for one of the machine-code bytes, a different tone will sound, and you just have to enter that byte again. Basically, all that is shown in listing 1 should tally with what is being printed onto the screen while you are entering the machine code.

When you have entered all the 5400 bytes of machine code, and are satisfied that all is correct, type New after entering

CLEAR 26999

to get rid of the Basic, whilst retaining the machine code. Then enter the program in listing 3, and save the two parts of the game using:

SAVE "TO THE TOP" LINE 0:
SAVE "C" CODE 27000,5400

Verify, and you are then ready to play.

```
28060:17   13   1    27   122  (180)
28065:179  32   251  219  254  (935)
28070:47   230  31   125  40   (473)
28075:234  62   1    211  254  (762)
28080:201  126  254  1    192  (774)
28085:42   4    91   124  181  (442)
28090:200  43   34   4    91   (372)
28095:205  212  105  201  0    (723)
28100:237  91   123  92   36   (581)
28105:0    111  41   41   41   (234)
28110:25   229  221  225  8    (708)
28115:121  230  7    17   255  (630)
28120:8    40   11   88   71   (218)
28125:87   62   1    15   16   (181)
28130:253  67   61   95   205  (681)
28135:30   110  217  1    8    (366)
28140:0    221  9    217  205  (652)
28145:30   110  120  61   7    (328)
28150:7    230  3    246  88   (574)
28155:103  120  1    2    2    (228)
28160:230  7    40   1    12   (290)
28165:203  90   32   1    4    (330)
28170:22   255  62   224  128  (691)
28175:95   58   104  91   197  (545)
28180:119  45   16   252  193  (625)
28185:25   13   32   246  201  (517)
28190:62   8    8    197  120  (395)
28195:31   55   31   167  31   (315)
28200:168  230  248  168  103  (917)
28205:121  7    7    7    168  (310)
28210:230  199  168  7    7    (611)
28215:111  221  126  0    221  (679)
28220:78   8    66   221  35   (408)
28225:15   203  9    16   251  (494)
28230:71   163  182  119  44   (579)
28235:203  90   121  32   13   (459)
28240:123  47   160  71   121  (522)
28245:163  176  182  119  44   (684)
28250:123  47   161  182  119  (632)
28255:193  4    8    61   32   (298)
28260:187  201  237  91   105  (821)
28265:91   123  230  7    32   (483)
28270:2    62   8    71   79   (222)
28275:62   1    15   16   253  (347)
28280:71   5    62   16   6    (162)
28285:205  149  110  203  89   (756)
28290:32   5    120  47   166  (370)
28295:119  44   54   0    44   (261)
28300:120  166  119  20   8    (433)
28305:61   32   232  201  122  (648)
28310:167  31   55   31   167  (451)
28315:31   170  230  246  170  (849)
28320:103  123  7    7    7    (247)
28325:170  230  199  170  7    (776)
28330:7    111  201  237  91   (647)
28335:105  91   33   118  92   (439)
28340:53   32   12   54   5    (156)
28345:35   126  198  4    254  (617)
28350:16   32   1    175  119  (343)
28355:33   103  91   126  183  (536)
28360:40   24   20   53   32   (169)
28365:13   43   52   70   62   (240)
28370:64   7    16   253  33   (373)
28375:28   91   182  119  58   (478)
28380:119  92   198  120  24   (553)
28385:71   33   107  91   28   (330)
28390:203  70   32   2    29   (336)
28395:29   183  254  8    40   (484)
28400:4    254  232  32   15   (537)
28405:126  47   119  122  254  (668)
28410:160  32   7    22   16   (237)
28415:62   1    50   102  91   (305)
28420:237  75   102  91   6    (511)
28425:0    33   28   91   9    (161)
28430:126  214  16   187  32   (575)
28435:5    62   24   50   103  (244)
28440:91   33   107  91   58   (380)
28445:119  92   198  104  203  (716)
28450:70   40   4    71   62   (247)
28455:220  144  237  83   105  (789)
28460:91   66   75   205  196  (633)
28465:109  58   102  91   71   (431)
28470:62   127  7    16   253  (465)
28475:33   28   91   166  119  (437)
28480:201  111  38   0    41   (391)
28485:41   41   237  91   123  (533)
28490:92   25   229  221  225  (792)
28495:197  121  230  7    32   (587)
28500:2    62   8    71   87   (230)
28505:62   1    15   16   253  (347)
28510:95   29   193  62   8    (387)
28515:8    120  167  31   55   (381)
28520:31   167  31   168  230  (627)
28525:248  168  103  121  7    (647)
28530:7    7    168  230  199  (611)
28535:168  7    7    111  197  (490)
28540:229  205  180  111  225  (950)
28545:36   205  180  111  193  (725)
28550:4    4    8    61   32   (109)
28555:215  124  15   15   15   (384)
28560:230  3    246  88   103  (670)
28565:203  90   120  17   226  (656)
28570:255  6    2    40   2    (305)
28575:5    29   230  7    14   (285)
28580:3    32   1    13   120  (169)
28585:54   6    45   16   251  (372)
28590:25   71   13   32   246  (387)
28595:201  66   221  126  0    (614)
28600:221  35   15   16   253  (540)
28605:71   203  90   32   12   (408)
28610:166  163  40   3    253  (625)
28615:119  0    120  163  182  (584)
28620:119  44   123  47   160  (493)
28625:71   166  40   3    253  (533)
28630:119  0    120  182  119  (540)
28635:201  237  91   24   91   (644)
28640:123  230  7    32   2    (394)
28645:62   8    71   79   62   (282)
28650:1    15   16   253  71   (356)
28655:5    62   8    8    205  (288)
28660:149  110  229  205  6    (699)
28665:112  225  36   205  6    (584)
28670:112  20   20   8    61   (221)
28675:32   237  201  203  89   (762)
28680:32   5    120  47   166  (370)
28685:119  44   120  166  119  (563)
28690:201  237  91   24   91   (644)
28695:58   23   91   183  40   (395)
28700:81   33   21   91   126  (352)
28705:20   20   203  126  40   (409)
28710:4    21   21   21   21   (88)
28715:35   35   53   32   36   (191)
28720:43   134  119  33   21   (350)
28725:91   71   203  126  32   (523)
28730:1    5    62   128  7    (203)
28735:16   253  33   28   91   (421)
28740:182  119  58   21   91   (471)
28745:203  127  40   29   33   (432)
28750:14   91   54   25   24   (208)
28755:22   58   22   91   33   (226)
28760:21   91   71   203  126  (512)
28765:40   1    5    62   127  (235)
28770:7    16   253  33   28   (337)
28775:91   166  119  62   136  (574)
28780:24   112  1    254  254  (645)
28785:237  120  71   203  72   (703)
28790:123  32   8    254  8    (425)
28795:32   2    30   240  29   (333)
28800:29   203  80   32   8    (352)
28805:254  238  32   2    30   (556)
28810:6    28   28   33   14   (109)
28815:91   126  183  40   3    (443)
28820:53   24   32   33   22   (164)
28825:91   78   8    0    33   (208)
28830:28   91   9    126  147  (401)
28835:254  8    56   16   254  (588)
28840:16   46   12   33   23   (132)
28845:91   54   12   33   21   (211)
28850:91   54   1    24   31   (201)
28855:1    254  127  237  120  (739)
28860:31   56   23   122  254  (486)
28865:16   40   18   213  17   (304)
28870:10   0    205  155  105  (475)
28875:209  33   23   91   54   (410)
28880:12   33   21   91   54   (211)
28885:255  58   26   91   230  (660)
28890:127  15   198  136  213  (689)
28895:66   75   253  54   0    (448)
28900:0    205  65   111  209  (590)
28905:237  83   24   91   201  (636)
28910:78   121  50   143  92   (484)
28915:229  205  46   106  225  (811)
28920:35   126  205  65   106  (537)
28925:35   126  203  127  40   (531)
28930:22   230  127  40   11   (430)
28935:254  127  200  71   35   (687)
28940:78   205  26   106  24   (439)
28945:10   35   126  50   143  (364)
28950:92   24   3    205  232  (556)
28955:105  35   24   223  243  (630)
28960:125  203  61   203  61   (653)
28965:47   230  3    79   6    (365)
28970:0    221  33   209  3    (466)
28975:221  9    58   72   92   (452)
28980:205  209  3    201  229  (847)
28985:33   136  115  205  238  (727)
28990:112  1    5    9    33   (160)
28995:9    92   54   35   35   (225)
29000:54   5    225  175  50   (509)
29005:65   92   50   106  92   (405)
29010:175  50   8    92   58   (383)
29015:8    92   254  13   200  (567)
29020:254  14   32   10   58   (368)
29025:65   92   238  1    50   (446)
29030:65   92   24   70   254  (505)
29035:6    32   10   58   106  (212)
29040:92   238  8    50   106  (494)
29045:92   24   56   254  12   (438)
29050:32   14   62   5    183  (298)
29055:40   47   13   43   54   (197)
29060:32   205  26   106  24   (393)
29065:28   203  127  32   200  (590)
29070:254  32   56   196  95   (633)
29075:175  50   65   92   62   (444)
29080:25   185  40   156  205  (641)
29085:26   106  123  119  35   (409)
29090:205  232  105  12   62   (616)
29095:95   205  232  105  62   (699)
29100:32   205  232  105  217  (791)
29105:33   200  0    17   0    (250)
29110:0    205  31   113  217  (566)
```

(continued on next page)

(continued from previous page)

In the software industry the whisper is ATARI...
AT U.S. GOLD WE ARE SHOUTING

ATARI!

It's time the whispering stopped. The word on the street says the next twelve months will see Atari really take off.

To reach these new found heights in computer gaming all you have to do is zoom down to your nearest computer store. You'll discover under the U.S. Gold Label possibly the widest range of software available for your Atari, at prices that won't bring you back to earth with a bump.

And we think that's something worth shouting about!

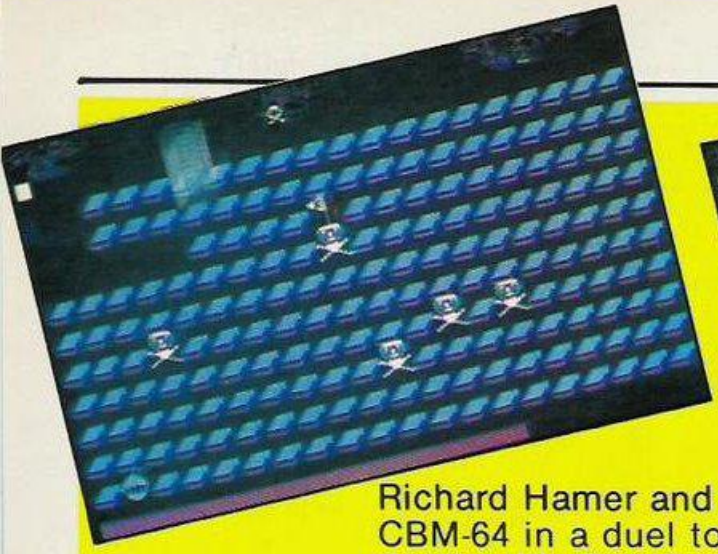
	Cassette	Disk
Beach-Head		£14.95
Bruce Lee	£14.95	£14.95
The Dallas Quest		£14.95
Pole Position	£9.95	£14.95
Dropzone	£9.95	£14.95
Zaxxon	£9.95	
Conan	£9.95	£14.95
Mr. Do!	£9.95	£14.95
Pac-Man	£9.95	£14.95
Dig-Dug	£9.95	£14.95
Dambusters	£9.95	£14.95
Quasimodo	£9.95	£14.95
NATO Commander	£9.95	£14.95
Spitfire Ace	£9.95	£14.95
Solo Flight	£9.95	£14.95
F-15 Strike Eagle	£14.95	£14.95

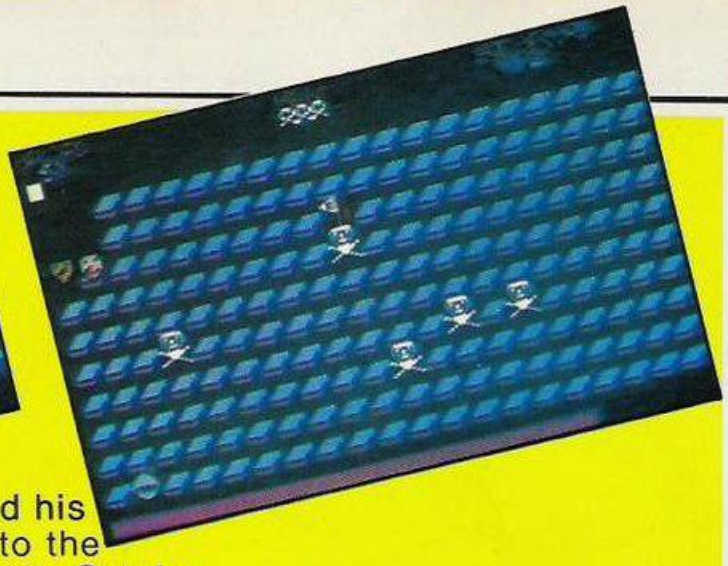
	Cassette	Disk
Blue Max	£9.95	£14.95
Drelbs	£9.95	£14.95
Bounty Bob Strikes Back	£9.95	£14.95
Ghost Chaser	£9.95	£14.95
Ollies Follies	£9.95	£14.95
Beer Beily Bert's Brew-Biz	£9.95	£14.95
Strip Poker	£9.95	£12.95
Aztec Challenge	£8.95	
Caverns of Khafka	£8.95	
Forbidden Forest	£8.95	
Slinky	£8.95	
O'Riley's Mine	£9.95	
Snokie	£9.95	
Battle for Normandy	£14.95	£14.95
Combat Leader	£14.95	£14.95
Tigers in the Snow	£14.95	£14.95
Knights of the Desert	£14.95	£14.95

Selected U.S. Gold Software is available from all leading computer stores and major high street retailers.

Dealers! For information on how you can become a U.S. Gold stockist contact Centresoft, Lightning, Microdealer or other leading distributors or write to:
U.S. Gold Limited, Unit 10, The Parkway Industrial Centre, Heneage Street, Birmingham B7 4LY.
Telephone: 021-359 8881. Telex: 337268

U.S. GOLD
All American Software





Richard Hamer and his CBM-64 in a duel to the death with Gruesome Gandy.

DEATH T

THERE ARE six parts to Deathtrap 64, each of which must be typed in and saved — separately from each other. The first is a short program, which relocates the start of Basic to make room for the graphical data. The second is the data for the graphics themselves. The third is the data for the continuous music/IRQ routine. My thanks must go to Paul Marzetti for his 64 Bar Blues articles, published in the October 1984 issue of *Your Computer*.

The fourth part is the row scrolling routine, the fifth part the moving routine — this repositions the sprites and works out whether they should be on the right or left-hand side of the screen. The sixth part is the program itself. When you have typed all of this in, load the first part and run it — loading will continue automatically. When it has finished loading you will be presented with the options page.

Pressing 1 will start the game. Pressing 2 increases the time — decrease rate — the higher this is — maximum 4 — the slower the time runs out. Pressing 3 will increase the initial skill level which can be from 1 to 9 — the higher this number is, the harder the game is. Level 1 has one chaser, level 2 two, and so on, up to level 7, which has, like level 6, the maximum of six chasers. Pressing four will change the chasers' IQ: I = Intelligent, D = Dunce.

You can use either a joystick in port 2, or by keys which are as follows:

Left — 2
Right — X
Up — I
Down — J

Scroll row left — Shift and 2 together — or fire button and left with the joystick.
Scroll row right — Shift and X — or fire button and right with joystick.
Warp — Function key F1. There is no joystick equivalent.

Now for the game itself; You, Messy-Martin, must cross the dreaded squares which are inhabited by the even more dreaded Gruesome Gandy. Once you leave a square, it disappears, leaving a hole for you to fall through — if you do so you lose a life. You can cross from the far left side of the screen to the right side and vice versa — if you do this, the square you have

Program 1.

```
0 POKE198,7:POKE631,76:POKE632,111:POKE633,13:POKE634,82:POKE635,117:POKE636,13
10 POKE44,40:POKE40*256,0:CLR:NEW
```

Program 2.

```
0 DATA 15, 240, 0, 53, 92, 0, 213, 92, 0, 221, 119
1 DATA 0, 213, 87, 0, 213, 87, 0, 215, 87, 0, 221
2 DATA 87, 0, 221, 119, 0, 55, 220, 0, 53, 92, 0
3 DATA 13, 112, 0, 3, 192, 0, 0, 0, 0, 0, 0
4 DATA 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0
5 DATA 0, 0, 0, 0, 0, 0, 0, 0, 0
6 DATA63, 252, 0,42,168, 0, 46, 184, 0, 42,168
7 DATA 0, 42, 232, 0, 43, 232, 0, 47, 168, 0, 58
8 DATA172,,58,172, 0, 14,176, 0, 14, 176, 0
9 DATA 3, 192, 0, 3, 192, 0, 0, 0, 0, 0, 0
10 DATA 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0
11 DATA 0, 0, 0, 0, 0, 0, 0, 0, 0
12 DATA 0, 85, 42, 1, 85, 34, 1, 85, 40, 5, 85
13 DATA 98, 5, 245, 104, 21, 245, 64, 85, 85, 98, 85
14 DATA 85, 98, 5, 85, 98, 5, 125, 106, 7, 245, 64
15 DATA 7, 245, 106, 5, 85, 72, 5, 85, 72, 5, 85
16 DATA 8, 1, 85, 8, 1, 85, 0, 0, 84, 0, 1
17 DATA 84, 0, 1, 4, 0, 5, 20, 0, 0
18 DATA 1, 80, 170, 5, 84, 170, 18, 132, 130, 27, 228
19 DATA 130, 91, 233, 0, 82, 137, 42, 85, 86, 34, 21
20 DATA 85, 106, 21, 85, 98, 21, 85, 64, 21, 85, 106
21 DATA 31, 245, 98, 31, 245, 106, 5, 245, 104, 5, 85
22 DATA 98, 1, 85, 0, 0, 84, 42, 0, 80, 8, 1
23 DATA 84, 8, 1, 4, 8, 5, 20, 8, 0
24 DATA 15, 255, 194, 13, 85, 114, 53, 85, 122, 53, 86
25 DATA 90, 213, 90, 152, 213, 154, 184, 213, 170, 183, 214
26 DATA 169, 183, 214, 169, 183, 154, 101, 87, 154, 101, 87
27 DATA 170, 85, 87, 170, 85, 92, 169, 85, 92, 169, 85
28 DATA 92, 229, 85, 92, 37, 85, 112, 13, 85, 112, 3
29 DATA 85, 192, 0, 213, 192, 0, 255, 0, 0
30 DATA 60, 66, 165, 129, 102, 24, 36, 195, 0, 24, 36
31 DATA 36, 126, 66, 129, 0, 0, 192, 176, 136, 240, 136
32 DATA 176, 192, 0, 3, 12, 48, 64, 48, 12, 3
33 DATA 0, 192, 160, 144, 136, 144, 160, 192, 0, 224, 152
34 DATA 128, 224, 128, 152, 224, 0, 224, 152, 128, 224, 152
35 DATA 128, 128, 0, 30, 96, 128, 159, 66, 50, 14
36 DATA 68, 68, 130, 130, 254, 130, 130, 68, 60, 219, 24
37 DATA 24, 24, 24, 219, 60, 7, 56, 200, 8, 4, 2
38 DATA 2, 60, 0, 72, 72, 80, 112, 76, 67, 64
39 DATA 32, 32, 32, 64, 64, 67, 140, 240, 130, 198, 202
40 DATA 170, 146, 129, 129, 129, 129, 193, 162, 162, 146, 146
41 DATA 142, 130, 24, 36, 66, 129, 129, 66, 36, 24
42 DATA 224, 152, 132, 130, 254, 128, 128, 128, 24, 36, 66
43 DATA 145, 187, 70, 38, 25, 252, 130, 129, 130, 252, 176
44 DATA 140, 131, 3, 12, 48, 192, 63, 12, 48, 192
45 DATA 15, 48, 200, 8, 4, 4, 2, 1, 66, 66, 66
46 DATA 66, 66, 66, 36, 24, 32, 33, 66, 68, 136, 144
47 DATA 160, 192, 129, 129, 145, 145, 169, 169, 165, 66
48 DATA 65, 66, 36, 40, 16, 48, 72, 136, 33, 18, 10
49 DATA 4, 8, 16, 16, 32, 192, 48, 12, 3, 252, 48
50 DATA 12, 3, 0, 0, 0, 0, 0, 0, 0, 0
51 DATA,,,,,,3,7,,,,,,,255,255,15,31,63,127,255,128,128,255,
   255,253,249,242,228,
40
52 DATA48,224
54 DATA 0, 0, 0, 0, 0, 0, 0, 0, 3, 15, 53
55 DATA 243, 243, 53, 15, 3, 3, 15, 49, 245, 241, 55
56 DATA 15, 3, 3, 15, 49, 245, 241, 53, 15, 3
57 DATA 3, 15, 49, 251, 251, 49, 15, 3, 204, 202, 204
58 DATA 202, 204, 192, 202, 202, 255, 255, 195, 219, 219, 195
59 DATA 255, 255, 202, 206, 192, 206, 196, 196, 196, 192
60 DATA 31, 32, 44, 33, 41, 36, 19, 8, 248, 4, 52
61 DATA 132, 148, 36, 200, 16, 196, 55, 15, 3, 3, 12
62 DATA 48, 192, 35, 236, 240, 192, 192, 48, 12, 3
63 DATA 0, 0, 3, 15, 31, 63, 127, 127, 126, 129, 197
64 DATA 242, 248, 252, 254, 254, 253, 196, 109, 109, 63, 31
65 DATA 15, 3, 191, 163, 54, 182, 252, 248, 240, 192
66 DATA 24, 36, 70, 137, 145, 98, 36, 24, 8, 24, 40
67 DATA 8, 16, 16, 16, 120, 24, 100, 130, 130, 6, 12
68 DATA 48, 127, 12, 52, 196, 12, 20, 36, 4, 124
69 DATA 32, 32, 68, 68, 136, 240, 30, 32, 15, 24, 96
70 DATA 124, 2, 1, 1, 62, 8, 16, 32, 96, 152, 68
71 DATA 40, 16, 6, 10, 18, 36, 12, 8, 8, 16
72 DATA 24, 36, 66, 36, 24, 36, 36, 24, 8, 20, 36
73 DATA 100, 20, 12, 4, 4
100 FORT=0TO4:FORM=0TO63:READA:POKE2048+M+T*64,A:NEXTM,T
101 FORT=0TO57:FORM=0TO7:READA:POKE8192+M+T*8,A:NEXTM,T
102 POKE198,6:POKE631,76:POKE632,111:POKE633,13:POKE634,82:
    POKE635,117:POKE636,1
3
```

just left is not destroyed. Your objective is to reach the bomb, collecting bonus flags on the way, so that you can defuse the bomb before its timer runs out, and it comes to get you.

If you run into Gruesome Gandy on the way your nose will immediately seize up and he will crush your head. All this is done behind a cloud.

If you do manage to defuse the bomb it will be replaced by another for you to defuse. After you have defused five bombs you move onto the bonus screen (qv).

While you guide Martin past Gandy, you must avoid the deadly Gandyish traps, the dreaded Ken-and-Shrimp bones. An added feature of this version is that you can — theoretically — scroll the row to your advantage. I say theoretically, because it takes quite a bit of practice. Remember, when scrolling, that squares are deadly, as are Ken-and-Shrimp bones to poor little Martin. Study the scrolling pattern — ie. have a practice on level 1 — so that you learn how to scroll without killing yourself. Helpful keys are:

F3 — Music on/off
F5 — Pause/Unpause
Shift F7 — Abort game and return to title screen.
Commodore £ — Stop game, return character set to normal, turn off sprites — I used it when debugging my program, you may find it useful.

If you find yourself stuck, you can press the warp button. But beware — it may transport you to your death, since Martin's warp facility has been malfunctioning ever since Gandy met him on a hot summer's day. Your warp machine can only work for a certain number of times per level — this is shown as a yellow bar at the top of the screen. Your time is the red bar at the bottom. Once this has run out, you are on your own until you complete that level.

When you have defused five bombs, you move onto the bonus screen, where you must try and get the flag — this is not always possible! Because sprites are used, you must aim towards the left of the flag — sometimes, you can lose your bonus because you are one pixel to the left.

Press a key to start and press it once again to start your descent. The quicker you do it, and the higher the level, the bigger the bonus you will receive. After this screen, the skill level is incremented, and you go back to the first screen.

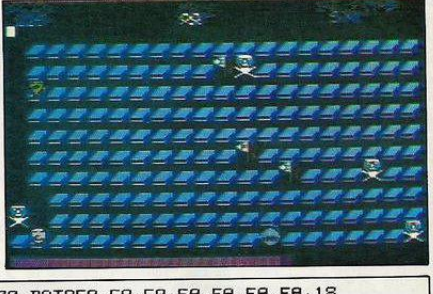
Finally, if you don't/can't type this program in, but would like a copy of it on tape, send a cheque/postal order for £2.50 made out to R. Hamer to: Deathtrap 64 Offer, 26 St. Barnabas Road, Emmer Green, Reading RG4 8RA.

(program 5 and 6 on page 79)

RAP 64

Program 3.

```
0 L=L+1:IFL=2THENLORD
1 IFL=3THEN715
19 DATA173,238,2,240,3,76,49,234,206,239,2,208,248,173,240,2
20 DATA141,239,2,174,2,,189,49,192,201,255,240,70,141,1,212
30 DATA189,92,193,141,,212,189,136,194,141,8,212,189,180,195,141
40 DATA7,212,189,224,196,141,15,212,189,12,198,141,14,212,232,234
50 DATA142,2,,169,,141,4,212,141,11,212,141,18,212,173,241
60 DATA2,141,4,212,173,242,2,141,11,212,173,243,2,141,18,212
70 DATA76,49,234,169,,141,2,,76,69,199
80 FORD=51000TO51106:READM:POKED,A:NEXT
90 DIMHT(20),LT(20),HM(20),LM(20),HB(20),LB(20)
100 FORA=0TO20:READHT(A),LT(A):HM(A)=HT(A):LM(A)=LT(A):HB(A)=HT(A):LB(A)=LT(A):N
EXT
130 DATA,,14,24,16,195,10,209,11,48,9,104,21,31,22,96,25,38,28,49,33,135,31,165
140 DATA37,162,42,62,44,193,50,68,63,75,8,97,10,143,12,143,255,255
200 POKE49800,0:POKE50100,0:POKE50400,0:POKE50401,0:POKE50700,0:POKE50701,0
201 FORA=0TO123:READB:POKE49200+A,HT(B):POKE49201+A,LT(B):POKE49800+A,0
202 POKE50100+A,0:POKE50401+A,HB(B):POKE50701+A,LB(B):NEXT
203 POKE49924,0:POKE50224,0:POKE50524,0:POKE50825,0:POKE50824,0:POKE50825,0
204 FORA=124TO224:READB:POKE49200+A,HT(B):POKE49200+A,LT(B):POKE49800+A,HM(B)
205 POKE50100+A,HM(B):POKE50400+A,HB(B):POKE50700+A,LB(B):NEXT
300 DATA3,2,3,1,4,1,5,5,5,3,2,3,1,4,1,5,5,5
310 DATA3,6,7,6,7,5,6,3,6,2,3,1,4,1,5,5,5
311 DATA3,2,3,1,4,1,5,5,5,3,6,7,6,7,3,6,3,6,2,6,3,7,9,10,10,10
312 DATA10,11,10,8,6,8,2,2,2,10,11,10,8,6,8,2,2,2
313 DATA10,12,13,12,13,10,12,10,12,11,10,8,6,8,2,2,2
314 DATA10,11,10,8,6,8,2,2,2,10,12,13,12,13,10,12,10,12,11,12,10,13,15,16,16,16
315 DATA16,20,20
320 DATA,,17,17,17,18,19,2,2,2,1,1,1,1,1,4,19,1,19,19,19,19,19,19,19,19,17,17
321 DATA17,18,19,19,19,5,5,5,5,5,18,18,4,18,5,17,17,17,17,17,17,17,17,17,17
322 DATA18,19,2,2,2,1,1,1,1,1,1,4,19,1,19,19,19,19,19,19,19,17,17,18,19,19
323 DATA19,19,19,5,5,5,5,5,18,4,18,5,17,17,17,,,20,20
499 S=54272
500 POKES+24,31:POKES+22,128:POKES+23,244:POKES+5,0:POKES+6,240
505 POKES+12,85
530 POKES+13,133:POKES+19,10:POKES+20,197:POKE753,17:POKE754,65:POKES+18,8
540 POKE755,33:POKE752,8:POKE788,56:POKE89,199
600 POKE2,125:POKE51100,125
714 POKE758,1:LORD
715 POKE198,6:POKE631,76:POKE632,111:POKE633,13:POKE634,82:POKE635,117:POKE636,1
3
```



Program 4.

```
0 DATAA9,FF,8D,20,CB,A0,4D,B1
10 DATAFB,C8,C8,91,FB,88,88,88
20 DATACC,20,CB,D0,F2,EA,EA,EA
30 DATAEA,EA,EA,EA,EA,EA,EA,18
40 DATAA9,08,E5,FC,30,3A,18,EA
50 DATAA9,D4,65,FC,4C,54,C8,A9
60 DATA0E,A0,00,91,FB,C8,91,FB
70 DATAA0,28,91,FB,C8,91,FB,A9
80 DATA1F,91,FD,A9,1E,88,91,FD
90 DATAA0,00,A9,1C,91,FD,C8,A9
100 DATA1D,91,FD,60,85,FC,4C,00
110 DATAC8,EA,EA,EA,EA,EA,EA,EA
120 DATAA9,D4,18,65,FE,85,FC,4C
130 DATA2F,C8,00,00,02,02,00,00
140 DATAA9,50,8D,20,CB,A0,02,B1
150 DATAFB,88,88,91,FB,C8,C8,C8
160 DATACC,20,CB,D0,F2,EA,EA,EA
170 DATAEA,EA,EA,EA,EA,EA,EA,18
180 DATAA9,08,E5,FC,30,3A,18,EA
190 DATAA9,D4,65,FC,4C,C4,C8,A9
200 DATA0E,A0,26,91,FB,C8,91,FB
210 DATAA0,4E,91,FB,C8,91,FB,A9
220 DATA1F,91,FD,A9,1E,88,91,FD
230 DATAA0,26,A9,1C,91,FD,C8,A9
240 DATA1D,91,FD,60,85,FC,4C,70
250 DATAC8,EA,EA,EA,EA,EA,EA,EA
260 DATAA9,D4,18,65,FE,85,FC,4C,9F,C8
500 FORT=0TO217:READA$:L$=LEFT$(A$,1):
    R$=RIGHT$(A$,1):L=ASC(L$):R=ASC(R$)
510 IFL>64THENL=L-55:GOTO530
520 L=L-48
530 IFR>64THENR=R-55:GOTO550
540 R=R-48
550 X=(L*16)+R:POKE51200+T,X:NEXT
1000 LOAD
```

THE WAITING IS OVER!

The long awaited follow-up to FOOTBALL MANAGER by KEVIN TOMS is now available

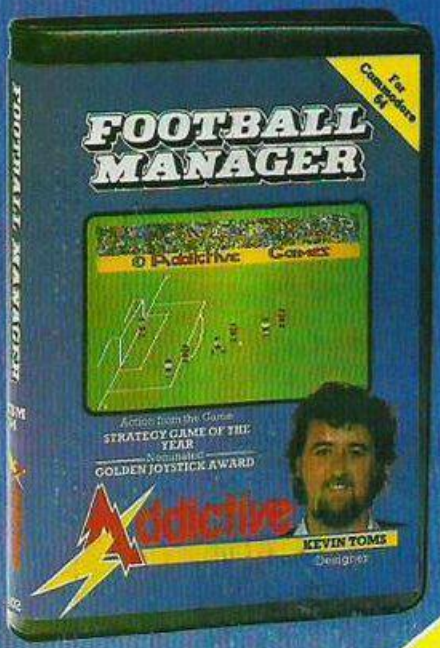
Available NOW for SPECTRUM 48K £6.95 COMMODORE 64 £7.95 AMSTRAD CPC 464 £7.95

SOFTWARE STAR is the NEW game from Kevin Toms, who designed the Software Classic – FOOTBALL MANAGER. SOFTWARE STAR allows *you* to try your hand at running a successful software company. You have to cope with staff problems, game launches, advertising, financial problems and more while trying to produce chart topping successful games. One other thing, SOFTWARE STAR has that *gripping* Addictive quality that all Kevin's games have!

NOW AVAILABLE FOR YOUR COMPUTER!

FOOTBALL MANAGER

by KEVIN TOMS



"Absorbing and realistic – Highly recommended" – *Sunday Times, February 1984*

"Completely fantastic – I want one!" – *Charlie Nicholas, Arsenal striker in Big K, April 1984*

Some outstanding features of the game
- Transfer market
- Promotion and relegation
- F.A. Cup matches
- Injury problems
- Full league tables
- Four Divisions
- Pick your own team for each match
- As many seasons as you like
- Managerial rating
- 7 skill levels
- Save game facility
- Financial manipulations
- You can even be sacked!

NEED WE SAY MORE

Addictive

FOOTBALL MANAGER is available for the following computers:–

AMSTRAD CPC 464	£7.95
COMMODORE 64	£7.95
SPECTRUM 48K	£6.95
ELECTRON	£7.95
BBC MODEL B	£7.95
ORIC 48K & ATMOS	£7.95
DRAGON	£5.95
ZX81 16K	£5.95
VIC 20+16K	£5.95
(soon for MSX)	

Available from WHSMITH and John Menzies (selected titles)

In case of difficulty buy by mail order.
Send Cheques/P.O.s to:–
ADDICTIVE GAMES
7a Richmond Hill, Bournemouth, Dorset BH2 6HE.

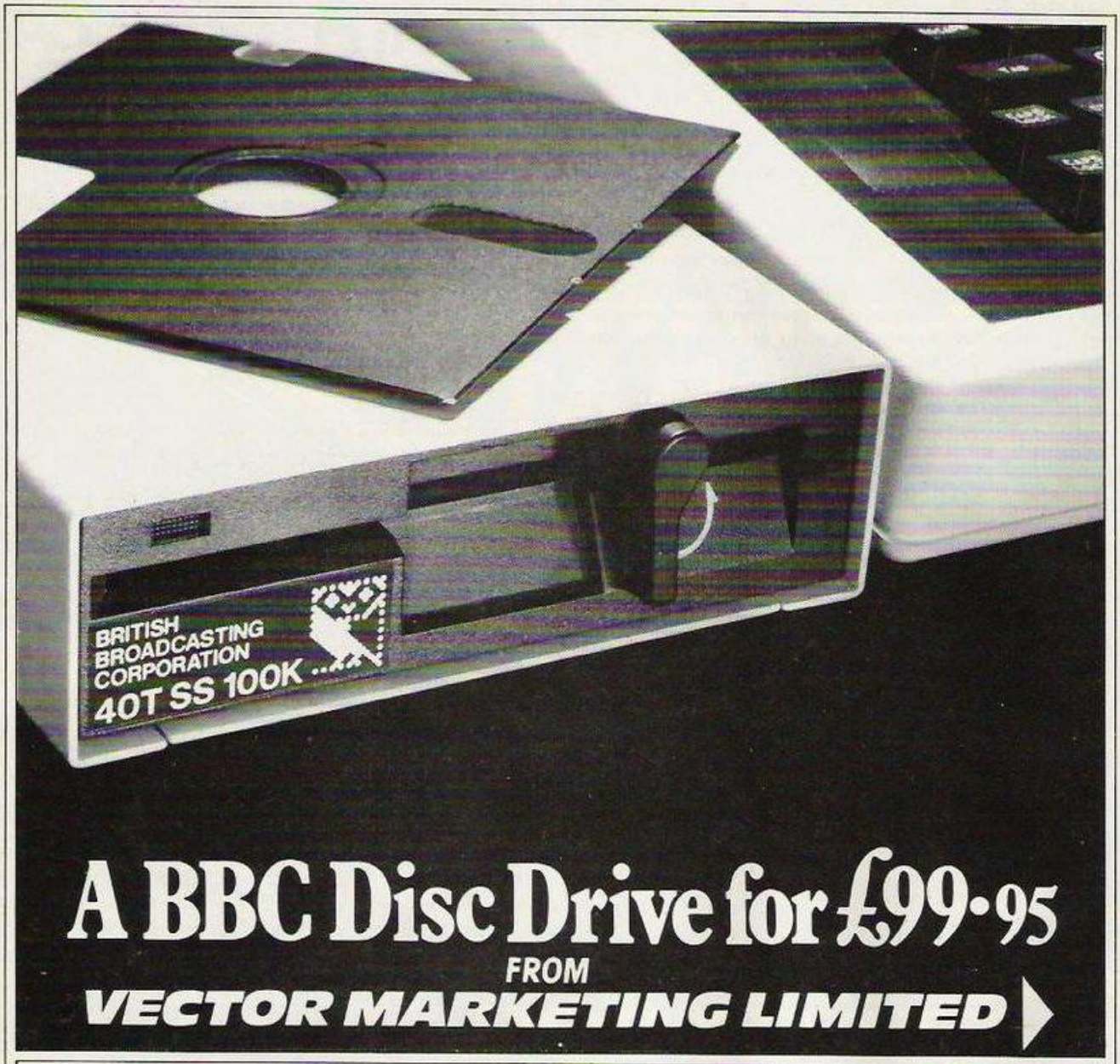
DEATH TRAP 64

Program 5.

```
1 DATA 169, 20, 133, 253, 169, 205, 133, 254, 160, 0, 24, 177, 253
2 DATA 113, 251, 145, 251, 76, 112, 203, 234, 234, 234, 234, 200, 192
3 DATA 16, 208, 237, 96, 24, 152, 106, 170, 169, 0, 56, 42, 224
4 DATA 0, 240, 4, 202, 76, 120, 205, 13, 16, 208, 141, 16, 208
5 DATA 76, 57, 203, 24, 152, 106, 170, 169, 255, 42, 224, 0, 240
6 DATA 4, 202, 76, 94, 203, 45, 16, 208, 141, 16, 208, 76, 57
7 DATA 203, 201, 0, 208, 9, 169, 1, 209, 253, 208, 191, 76, 63
8 DATA 203, 201, 255, 208, 184, 169, 255, 209, 253, 208, 178, 76, 88
9 DATA 203, 96, 0, 0, 2, 2, 0, 0, 2, 2, 0, 0, 2
10 DATA 2, 0, 0, 2, 2, 0, 0, 2, 2, 0, 0, 2, 2
100 FORT=52001TO52130:READA:POKET,A:NEXT
105 POKE52600,24:POKE52601,76:POKE52602,70:POKE52603,203
110 POKE198,7:POKE631,76:POKE632,111:POKE633,13:POKE634,82:POKE635,117:POKE636,1
3
```

Program 6.

```
0 POKE53272,24:POKE750,0:POKE53280,0:POKE53281,0:SF=1:DR=1:C$="I"
1 LS$="Z":RS$="X":LL$="♦":RR$="♠":US$="I":DS$="J":WW$="■":V=53248:S=54272
3 DIMDX(16),DY(16)
4 FORT=1TO5:HS(T)=500:NEXT:H$(1)="GSY":H$(2)="AMU":H$(3)="NEC":H$(4)="DLK"
5 H$(5)="YLY":V=53248:S=54272
6 FORT=0TO7:POKE2368+T*3,PEEK(8544+T):POKE2369+T*3,PEEK(8552+T):POKE2370+T*3,0
7 POKE2383+T*3,PEEK(8560+T):POKE2384+T*3,PEEK(8568+T):POKE2385+T*3,0:NEXT:FORT=4
8TO62
8 POKE2368+T,0:NEXT :POKE650,255:FORT=9472TO9479:POKET,255:NEXT:Q=56320:DX=52500
:DY=DX+1
9 POKES-1000,24:POKE2,125:POKE51100,125:GOSUB10:POKEV+37,10:POKEV+21,0:POKEV+38,
0:GOTO19
10 PRINT"□■          COPYRIGHT 1985  BY R HAMER"
11 PRINT"■■@@@  @@@   @   @@@ @ @ @@@ @@@   @   @@@";
12 PRINT"@  @ @    @ @   @  @ @  @  @ @  @ @  @ @";
13 PRINT"@  @ @   @   @  @  @ @  @  @ @ @   @ @ @";
14 PRINT"@  @ @@  @@@@@  @  @@@  @  @@@ @@@@@ @@@";
15 PRINT"@  @ @   @   @  @  @ @  @  @@  @   @ @"
16 PRINT"@  @ @   @   @  @  @ @  @  @ @ @   @ @"
17 PRINT"@@@  @@@ @   @  @  @ @  @  @ @ @   @ @■64■"
18 PRINT"BY GANDY GRAPHICS FOR YOUR COMPUTER":RETURN
19 POKE51041,141:POKE51042,8:POKE51043,212:POKE51047,141:POKE51048,7:POKE51049,2
12
20 PRINT"■OPTIONS ■":PRINT"■1 START GAME■":PRINT"2 DECREASE RATE"DR"■   "
21 PRINT"■3 SKILL"SF"■   ":PRINT"■4 CHASER "C$"TTTTT"
22 FORT=1TO1000
25 GETA$:V=VAL(A$):IFV<1ORV>4THENNEXT:GOSUB10:GOTO50
26 ONVGOTO98,30,35,37
30 DR=DR+1:IFDR>4THENDR=1
31 PRINTSPC(15)DR"T":GOTO22
35 SF=SF+1:IFSF>9THENSF=1
36 PRINT"■■"SPC(7)SF"TTT":GOTO22
37 IFC$="I"THENC$="D":GOTO39
38 IFC$="D"THENC$="I"
39 PRINT"■■■■"SPC(9)C$"TTTTT":GOTO22
50 PRINT"■HIGH SCORES:■■":FORT=1TO5:PRINT,T"■■"HS(T),H$(T):PRINT:NEXT
51 FORT=1TO10000:NEXT:GOSUB10:GOTO20
98 V=53248:S=54272:FORT=V+40TOV+45:POKET,0:NEXT:POKE750,1:HS=HS(1):SC=0:ME=3:SK=
SF
99 FORT=51041TO51043:POKET,234:NEXT:FORT=51047TO51049:POKET,234:NEXT:POKE54279,0
:POKE54280,0
100 BO=0:POKE750,1:POKES+24,0:POKE51100,0:POKE53265,PEEK(53265)AND239
101 PRINT"□■SCORE               MEN            HI SCORE":PRINT"■ 0"TAB(30)HS"TT"
102 PRINTTAB(17);:FORT=1TOME:PRINT"@";:NEXT:PRINT
103 L=0:PRINT:FORT=1TO10:PRINT"□£]£]£]£]£]£]£]£]£]£]£]£]£]£]£]£]£]£]£]£]";
104 PRINT"↑←↑←↑←↑←↑←↑←↑←↑←↑←↑←↑←↑←↑←↑←↑←↑←↑←↑←↑←↑←";:NEXT
105 FORT=0TOINT(RND(1)*10):X=(INT(RND(1)*20)*2)+(INT(RND(1)*10)*80)
106 POKEX+1144,33+INT(RND(1)*4)
107 POKEX+1145,37:POKEX+1184,32:POKEX+1185,39:POKEX+55416,13:POKEX+55417,8
108 POKEX+55457,8:NEXT:X=0
110 FORT=1TOSK*5:X=(INT(RND(1)*20)*2)+(INT(RND(1)*10)*80):IFX=0THENT=T-1:NEXT
111 POKEX+1144,40:POKEX+1145,41
112 POKEX+1184,42:POKEX+1185,43:POKEX+55416,1:POKEX+55417,1:POKEX+55456,1
113 POKEX+55457,1:NEXT:X=0
120 BX=(INT(RND(1)*20)*2):BY=(INT(RND(1)*10)*2):X=BX+BY*40
121 POKEX+1144,44:POKEX+1145,45
122 POKEX+1184,46:POKEX+1185,47:POKEX+55416,12:POKEX+55417,12:POKEX+55456,12
123 POKEX+55457,12:X=0
130 POKE2040,32:FORT=2041TO2046:POKET,33:NEXT:POKE2047,37
131 V=53248:FORT=VTOV+15:POKET,0:NEXT:POKEV+16,0:POKEV+29,0:POKEV+23,0:POKEV+28,
127
140 POKEV,24:POKEV+1,74
141 POKEV+21,255
149 SL=SK:IFSL>6THENSL=6
150 FORT=1TOSL:X=24+(INT(RND(1)*20)*16):Y=74+(INT(RND(1)*10)*16):IFX=0ORX=1THEN1
50
151 Z=2*T:IFX>255THENPOKEV+16,PEEK(V+16)OR2↑T:X=X-256
152 POKEV+Z,X:POKEV+Z+1,Y:IFPEEK(V+Z)=PEEK(V)ANDPEEK(V+Z+1)=PEEK(V+1)THENT=T-1
153 NEXT
160 FORT=1TO40-SK:POKE1983+T,160:POKE56255+T,2:NEXT:FORT=1TOSK:POKE55375+T,7
161 POKE1103+T,160:IFT>38THENWA=T:TT=40-SK:T=0:GOTO180
162 NEXT:WA=T-1:TT=40-SK
180 REM
199 POKE53265,PEEK(53265)OR16:POKE750,0:POKE2,0:POKE51100,0:FORT=1TO100:NEXT:POK
ES+24,31
200 IFHS<SCTHENHS=SC
201 A$="":PRINT"■■"SC,,,HS
260 IFA$<>""THEN389
300 FORT=0TO15:POKEDX+T,0:NEXT:IFC$="I"THEN310
302 FORT=1TOSL:EX=DX+T*2:EY=DY+T*2:XX=INT(RND(1)*4):IFXX=0THENPOKEEX,255
303 IFXX=1THENPOKEEX,1
304 IFXX=2THENPOKEEY,255
305 IFXX=3THENPOKEEY,1
306 GOTO320
310 XX=PEEK(V)-(((PEEK(V+16)AND1)=1)*256):FORT=1TOSL:EX=DX+T*2:EY=DY+T*2
311 Y=PEEK(V+1+T*2):YY=PEEK(V+1):IFY>YYTHENPOKEEY,255:GOTO320
312 X=PEEK(V+T*2)-(((PEEK(V+16)AND2↑T)=2↑T)*256)
313 IFX<XXTHENPOKEEX,1:GOTO320
314 IFX>XXTHENPOKEEX,255:GOTO320
315 IFY<YYTHENPOKEEY,1
320 PZ=2↑T:PY=PEEK(V+16)ANDPZ:C=PEEK(EY):IFC=255THENC=-1
321 D=PEEK(EX):IFD=255THEND=-1
322 P=PEEK(V+2*T):IF(P+D<24ANDPY=0)OR(P+D>72ANDPY=PZ)THENPOKEEX,0
323 R=PEEK(V+1+T*2):IFR+C<74ORR+C>218THENPOKEEY,0
328 NEXT
330 GETA$:Z=0
331 P2=31-(PEEK(Q)AND31)
332 IFA$=LS$ORP2=4THENPOKEDX,255:Z=-1
333 IFA$=RS$ORP2=8THENPOKEDX,1:Z=1
334 IFA$=US$ORP2=1THENZ=-40:POKEDY,255
335 IFA$=DS$ORP2=2THENZ=40:POKEDY,1
336 IFA$=LL$ORP2=20THENZ=-100:GOTO1100
337 IFA$=RR$ORP2=24THENZ=100:GOTO1100
338 IFZ<>0ORA$=""THEN350
339 IFA$=WW$THEN1000
340 IFA$="■"ANDPEEK(753)=0THENPOKE753,17:POKE755,33:GOTO342
341 IFA$="■"ANDPEEK(753)<>0THENPOKE753,0:POKE755,0
342 IFA$="■"THEN9
343 IFA$<>"■"THEN345
344 GETA$:IFA$<>"■"THEN344
345 IFA$="="THENPOKE53272,21:POKEV+21,0:STOP
346 GOTO300
350 PY=PEEK(V+16)AND1:IFABS(Z)=40THEN355
352 P=PEEK(V)+Z:IF(P<24ANDPY=0)OR(P>72ANDPY=1)THENZ=0:POKEDX,0:GOTO1300
353 GOTO389
355 P=PEEK(V+1)+Z/40:IFP<74ORP>218THENZ=0:POKEDY,0
389 POKE251,0:POKE252,208
391 FORL=0TO15:SYS52001:NEXT
392 T=PEEK(V+30)
396 SS=((PEEK(V)-24)/8)+((PEEK(V+1)-74)*5)+1144:PY=PEEK(V+16)AND1:IFPY=1THENSS=S
S+32
397 T=PEEK(SS)
398 IFT=44THEN401
399 IF(PEEK(V+30)AND1)=1THEN700
401 G=0-PEEK(52500)*2:H=0-PEEK(52501)*80:IFG=-510THENG=2
402 IFH=-20400THENH=80
403 IFG=0ANDH=0THEN405
404 SR=SS+G+H:POKESR,32:POKESR+1,32:POKESR+40,32:POKESR+41,32:SC=SC+10
405 IFT=28THEN500
406 IFT=40ORT=32THEN700
407 IFT<>44THEN450
408 BO=BO+1
409 FORT=1984+TTTO1984STEP-1:POKES+7,46:POKES+8,253:POKET,32:SC=SC+21
410 IFHS<SCTHENHS=SC
411 PRINT"■■"SC,,,HS:POKES+7,0:POKES+8,0:NEXT
412 IF BO=5THEN4000
415 TT=40-SK
416 FORT=1TOTT:POKE1983+T,160:POKE56255+T,2:NEXT
417 X=1144+BX+BY*40:POKEX,28:POKEX+1,29:POKEX+40,30:POKEX+41,31:X=X+S:POKEX,14:P
OKEX+1,14
418 POKEX+40,14:POKEX+41,14
420 BX=(INT(RND(1)*20)*2):BY=(INT(RND(1)*10)*2):X=BX+BY*40
421 POKEX+1144,44:POKEX+1145,45
422 POKEX+1184,46:POKEX+1185,47:POKEX+55416,12:POKEX+55417,12:POKEX+55456,12
423 POKEX+55457,12:X=0
425 GOTO200
450 FORT=1TO125STEP5:POKES+7,45:POKES+8,215:SC=SC+5:IFSC>HSTHENHS=SC
451 PRINT"■■"SC,,,HS:POKES+7,0:POKES+8,0:NEXT
455 X=SS:POKEX,28:POKEX+1,29:POKEX+40,30:POKEX+41,31:X=X+S:POKEX,14:POKEX+1,14
456 POKEX+40,14:POKEX+41,14
460 GOTO200
500 POKEV+16,PEEK(V+16)AND127:TT=TT-(1/DR):POKETT+1985,32:IFTT>=0THEN200
509 POKEV+28,127:POKEV+46,12
510 POKEV+21,255:POKEV+14,0:POKEV+15,0:POKE2047,37:X=1144+BX+BY*40:POKEX,32:POKE
X+1,32
511 BX=24+BX*8:BY=74+BY*8:BZ=BX:IFBX>255THENBX=BX-256:POKEV+16,PEEK(V+16)OR128
515 POKEX+40,32:POKEX+41,32:POKEV+14,BX:POKEV+15,BY:X=PEEK(V):PP=12
516 Y=PEEK(V+1):IF(PEEK(V+16)AND1)=1THENX=X+256
519 PP=PP-.05:IFPP>=1THENPOKE752,PP
520 IFBZ<XTHENBX=BX+2:IFBX=256THENPOKEV+16,PEEK(V+16)OR128:POKEV+14,0:BX=0
521 IFBZ>XTHENBX=BX-2:IFBX=-2THENPOKEV+16,PEEK(V+16)AND127:POKEV+14,254:BX=254
522 IFBY<YTHENBY=BY+2
523 IFBY>YTHENBY=BY-2
524 BZ=BX:IF(PEEK(V+16)AND128)=128THENBZ=BX+256
525 POKES+7,255:POKES+8,50:POKEV+15,BY:POKEV+14,BX:POKES+8,0:IFBZ<>XORBY<>YTHEN5
19
526 POKES+7,0
530 FORT=1TO35:G=53265:POKEG,(PEEK(G)AND248)+INT(RND(1)*8)
531 POKEG+5,(PEEK(G+5)AND248)+INT(RND(1)*8):NEXT:POKEG,(PEEK(G)AND248)+3
532 POKEG+5,(PEEK(G+5)AND248)
535 POKE2047,36:POKEV+37,11:POKEV+38,15:POKEV+46,7:POKEV+21,128:POKEV+28,255:FOR
T=BYTO0STEP-1
536 POKEV+15,T:NEXT:POKEV+21,255:POKEV+38,0:POKEV+37,10:ME=ME-1:IFME=0THEN2000
540 FORT=1TO40-SK:POKE1983+T,160:POKE56255+T,2:NEXT
541 TT=40-SK
549 POKE1081+ME,32
550 BX=(INT(RND(1)*20)*2):BY=(INT(RND(1)*10)*2):X=BX+BY*40
551 POKEX+1144,44:POKEX+1145,45
552 POKEX+1184,46:POKEX+1185,47:POKEX+55416,12:POKEX+55417,12:POKEX+55456,12
553 POKEX+55457,12:X=0
554 POKE752,10:GOTO200
700 POKE2047,36:POKEV+37,11:POKEV+38,15:POKEV+46,7:POKEV+21,128:POKEV+28,255
701 POKEV+14,PEEK(V):POKEV+16,PEEK(V+16)OR((PEEK(V+16)AND1)*128):FORT=PEEK(V+1)T
O0STEP-1
702 POKEV+15,T:NEXT:POKEV+21,255:POKEV+38,0:POKEV+37,10:ME=ME-1:IFME=0THEN2000
703 POKE1081+ME,32
704 POKESS,28:POKESS+1,29:POKESS+40,30:POKESS+41,31:BB=SS+S
705 POKEBB,14:POKEBB+1,14:POKEBB+40,14:POKEBB+41,14
999 GOTO200
1000 IFWA=0THEN260
1001 POKE1103+WA,32:WA=WA-1:U=INT(RND(1)*20)*16:T=INT(RND(1)*10)*16:POKEV+1,0
1002 U=U+24:T=T+74:POKEV+16,PEEK(V+16)AND254:IFU>255THENU=U-256:POKEV+16,PEEK(V+
16)OR1
1003 FORL=1TO2:FORM=0TO15:POKE53280,M:POKE54279,46:POKE54280,253:POKE54279,0
1004 POKE54280,0:NEXTM,L:POKE53280,0:POKEV,U:POKEV+1,T:GOTO260
1100 X=1144+((PEEK(V+1)-74)*5):Y=INT(X/256):XX=X-Y*256:POKE251,XX:POKE253,XX
1101 YY=X:ZZ=YY:YY=YY+38:IFZ<0THENYY=YY-38:ZZ=ZZ+38
1102 ZX=PEEK(YY)
1103 CC=0:IF1144+BY*40=XTHENCC=1
1105 POKE252,Y:POKE254,Y:IFZ<0THENSYS51312:IFCCTHENBX=BX-2
1110 IFZ>0THENSYS51200:IFCCTHENBX=BX+2
1120 IFZX<>40ANDZX<>44THEN389
1121 POKEZZ,ZX:POKEZZ+1,ZX+1:POKEZZ+40,ZX+2:POKEZZ+41,ZX+3
1122 ZZ=ZZ+S:IFZX=40THENPOKEZZ,1:POKEZZ+1,1:POKEZZ+40,1:POKEZZ+41,1:GOTO389
1123 POKEZZ,12:POKEZZ+1,12:POKEZZ+40,12:POKEZZ+41,12:IFZ<0THENBX=38
1124 IFZ>0THENBX=0
1125 POKE52500,0:POKE52501,0:GOTO389
1300 P=PEEK(V+16)AND1:IFP=1THENPOKEV+16,PEEK(V+16)AND254:POKEV,24:GOTO1302
1301 POKEV+16,PEEK(V+16)OR1:POKEV,72
1302 POKE52500,0:POKE52501,0:GOTO389
1999 S=54272:V=53248:SC=1500:W$=" ":R$="X":L$="Z"
2000 POKE752,10:POKE2,125:POKE51100,125:PRINT"J":POKEV+21,0:POKES-1000,21
2010 FORT=1TO20:POKES+7,255:POKES+8,50:PRINT,"■GAME OVER":POKES+7,0:POKES+8,0:NE
XT
2015 IFSC<HS(5)THEN9
2020 FORT=5TO1STEP-1:IFHS(T)<SCTHENNEXT
2025 T=T+1:FORL=5TOT+1STEP-1:HS(L)=HS(L-1):H$(L)=H$(L-1):NEXT
2030 PRINT"J":G$="■■■■■■■■■■■■■":B$="ABCDEFGHIJKLMNOPQRSTUVWXYZ RUB END SPACE"
2033 PRINTG$TAB(19)"T■■■■":D=0
2035 B$=B$+B$:PRINTG$MID$(B$,1,40):X=1
2039 N$=""
2040 GETA$:Z=0:PRINT"■■■■■■■■■■■■■■"N$"     "
2041 Q=56320:P=PEEK(Q):P1=PEEK(Q+1):P2=31-(PAND31):P3=31-(P1AND31)
2042 IFA$=LS$ORP2=4ORP3=4THENZ=-1
2043 IFA$=RS$ORP2=8ORP3=8THENZ=1
2044 IFA$=WW$ORP2=16ORP3=16THENZ=40
2045 IFZ=40THEN2100
2050 X=X+Z:IFX=0THENX=41
2055 IFX=42THENX=2
2060 PRINTG$MID$(B$,X,40)
2070 GOTO2040
2100 CC=X:IFCC>40THENCC=CC-40
2104 CC=CC+19:IFCC>40THENCC=CC-40
2105 IFCC>26THEN2140
2110 N$=N$+MID$(B$,CC,1):IFLEN(N$)<>4THEN2040
2120 N$=LEFT$(N$,3):GOTO2040
2140 IFCC>26ANDCC<32ANDLEN(N$)THENN$=LEFT$(N$,LEN(N$)-1):GOTO2040
2145 IFCC>31ANDCC<36THENH$(T)=N$:HS(T)=SC:GOTO9
2150 N$=N$+" ":IFLEN(N$)<>4THEN2040
2155 GOTO2120
4000 POKEV+21,1:POKEV,0:POKEV+16,0:POKEV+1,74
4010 PRINT"□■■■■■■■■■■■■■■■■■■■■■■■■()()()()()()()()()()()()()()()()()()";
4011 PRINT"■+■+■+■+■+■+■+■+■+■+■+■+■+■+■+■+■+■+■+■+TTT"
4013 X=INT(RND(1)*15)*2:PRINTTAB(X)" ■■ T■■■ T■■■ T■ ■"
4016 GETA$:IFA$<>""THEN4016
4017 GETA$:IFA$=""THEN4017
4018 TI$="000000"
4020 FORT=24TO255:POKEV,T:GETA$:IFA$<>""THEN4060
4021 NEXT:FORT=PEEK(V+1)TOPEEK(V+1)+8:POKEV+1,T:NEXT
4022 FORT=255TO24STEP-1:POKEV,T:GETA$:IFA$<>""THEN4060
4023 NEXT:FORT=PEEK(V+1)TOPEEK(V+1)+8:POKEV+1,T:NEXT:IFT<229THEN4020
4024 P=1024+PEEK(V)/8+PEEK(V+1)*5:XX=PEEK(P):IFXX>39THEN4090
4030 GOTO4063
4060 FORT=PEEK(V+1)TO229:POKEV+1,T:NEXT
4062 POKEV+21,0:P=1904+(PEEK(V)-24)/8:XX=PEEK(P):IFXX>39ORXX=32THEN4090
4063 VV=59-VAL(TI$):PRINT"□WELL DONE":PRINT"■BONUS"VV*SK*10:SC=SC+VV*SK*10
4064 FORT=1TO5000:NEXT:GOTO4100
4090 PRINT"□BAD LUCK YOU MISSED":FORT=1TO3000:NEXT
4100 SK=SK+1:GOTO100
9999 GOTO200
```



A BBC Disc Drive for £99·95

FROM

VECTOR MARKETING LIMITED

Why continue to use slow cassette Tape Storage when you can buy a highly reliable Disc Drive for the remarkable low price of

£99.95 inc. VAT

Using 5¼ standard floppy diskettes the Drive is powered by the BBC computer providing 100 Kbytes of storage on 40 tracks.

IF YOU REQUIRE A DISC INTERFACE TO BE FITTED SEND YOUR COMPUTER TO VECTOR MARKETING LTD. THE UPGRADE WILL BE FITTED FOR THE INCLUSIVE PRICE OF £99.

The entire range of BBC approved Micro-Computer system is available from Vector Marketing Ltd together with the full range of Acornsoft Software. Telephone 0933 79300 for details.

Vector Marketing Ltd. London Rd, Wellingborough, Northants.NN8 2RL.

ORDER BY PHONE

using your Access or Barclaycard on 0933 79300 or send your cheque/credit card number to: Vector Marketing Ltd. London Rd, Wellingborough, Northants.NN8 2RL.

Please send me _____ Disc Drives at **£99.95** ea.

Name _____

Address (to agree with credit card account) _____

_____

_____ Post Code _____

Telephone No. (in case of query) _____

Cheque enclosed for £ _____ or charge my Access/ Barclaycard A/c

Signed _____

Expiry date of credit card _____ Tick if VAT invoice required ☐ Offers not applicable outside U.K.

Company Reg. No. 1632455 (YC7)

Listing 1.

```
  4 LOAD ""CODE : CLS
  5 CLS : REM t=WAVES+B*+TIM+CL
053+
  6 POKE 65500,0: POKE 65501,12
9
  7 PRINT "PRESS  L  TO LOAD FR
AMES": PRINT : PRINT "
OTHER KEY TO CONTINUE"
  8 IF INKEY$="L" THEN GO TO 50
90
  9 IF INKEY$=" " THEN GO TO 8
 10 CLS : PLOT 127,0: DRAW 0,127
5 PLOT 0,87: DRAW 255,0: DIM H(127): DIM
 20 DIM L(127): DIM U(127)
G(127): DIM O(127)
 25 DIM F(127): DIM D(127)
 30 LET A=43
 35 LET D=-1: LET G=1
 40 FOR G=1 TO 127
 50 FOR G=1 TO 127
 60 IF INKEY$="9" THEN PLOT G+D
,A: GO TO 100
 65 IF INKEY$="0" AND T=2 THEN
FOR G=1 TO 127: LET H(G)=L(G)+88
: PLOT G+128,H(G): NEXT G: GO TO
 116
 66 IF INKEY$="0" AND T=4 THEN
FOR G=1 TO 127: LET U(G)=O(G)+88
: PLOT G+128,U(G): NEXT G: GO TO
 116
 70 IF INKEY$="8" THEN LET A=A+
1: PLOT G+D,A: GO TO 100
 75 IF INKEY$="5" THEN LET A=A-
1: PLOT G+D,A: GO TO 100
 80 IF INKEY$="6" THEN LET A=A+
.5: PLOT G+D,A: GO TO 100
 90 IF INKEY$="9" THEN LET A=A-
.5: PLOT G+D,A: GO TO 100
 91 IF INKEY$="1" THEN INPUT "S
TARTING DEGREE -";P: GO TO 1000
 95 GO TO 60
 100 IF T=1 THEN LET L(G)=A: GO
TO 115
 101 IF T=2 THEN LET H(G)=A: GO
TO 115
 102 IF T=3 THEN LET O(G)=A: GO
TO 115
 110 LET U(G)=A
 115 NEXT G
 116 IF T=2 THEN CLS : PLOT 127,
0: DRAW 0,175: PLOT 0,87: DRAW 2
55,0: LET A=43: LET D=-1
 117 IF T=1 THEN LET A=131: LET
D=127
 118 IF T=3 THEN LET A=131: LET
D=127
 130 NEXT T
 140 OVER 1: PLOT 127,0: DRAW 0,
175: PLOT 0,87: OVER 0
 141 FOR G=1 TO 127: LET F(G)=O
(G)-L(G)/8: LET D(G)=U(G)-H(G)
/8: NEXT G
 145 INPUT "SOUTH TO NORTH ? ";S
$
 146 INPUT "WEST TO EAST ? ",W$
 147 CLS : FOR C=1 TO 127: PLOT G,L(G+
 148 FOR G=0 TO 126: NEXT G
1): PLOT G+128,H(G+1): NEXT G
 149 IF S$="Y" THEN GO TO 152
 150 IF W$="Y" THEN GO TO 200
 151 GO TO 2000
 152 FOR A=0 TO 126 STEP 4
 160 PLOT A,L(A+1)
 170 DRAW 128,88+((H(A+1)-88)-L(
A+1))
 180 NEXT A
 190 GO TO 150
 200 FOR T=0 TO 126
 210 LET B=L(T+1): LET A=T
 220 FOR G=1 TO 10
 230 LET A=A+1: LET B=B+8.8
 240 LET B=B+((H(T+1)-88)-L(T+1)
)/10
 245 PLOT A,B
 250 NEXT G
 260 NEXT T
 270 GO TO 2000
 1010 FOR O=G-1 TO 126
 1020 LET J=(SIN (P/360*2*PI)+40+
40)
 1025 PLOT D+((T=2 OR T=4)*128),J
 1026 IF T=1 THEN LET L(D+1)=J: G
O TO 1030
 1027 IF T=2 THEN LET H(D+1)=J+88
: GO TO 1030
 1028 IF T=3 THEN LET O(D+1)=J: G
O TO 1030
 1029 LET U(D+1)=J+88
 1030 LET P=P+(360/127)
 1040 NEXT D
 1050 GO TO 116
2000 POKE 65532,PEEK (65498+C*2)
: POKE 65533,PEEK (65499+C*2): L
ET A=USR 65400
2001 POKE 65498+((C+1)*2),PEEK 6
5534: POKE 65499+((C+1)*2),PEEK
65535
2002 FOR G=1 TO 127
2010 LET L(G)=L(G)+F(G)
2015 LET H(G)=H(G)+D(G)
2020 NEXT G
2025 STEP .5,10
2030 CLS
2040 NEXT C
4000 FOR G=1 TO 9
4000 POKE 65532,PEEK (65498+G*2)
4010 POKE 65533,PEEK (65499+G*2)
: POKE 65532,PEEK (65498+G*2)
4020 LET A=USR 65450
4025 IF INKEY$="E" THEN GO TO 50
00
4030 NEXT G
4040 FOR G=9 TO 1 STEP -1
4050 POKE 65532,PEEK (65498+G*2)
: POKE 65533,PEEK (65499+G*2)
4060 LET A=USR 65450
4065 IF INKEY$="E" THEN GO TO 50
00
4070 NEXT G
4080 GO TO 4000
5000 CLS : PRINT "PRESS  S  TO S
AVE ALL FRAMES": PRINT "
                R  TO RESTART PROGRAM": P
RINT "
                A  TO SEE A
NIMATION"
5010 IF INKEY$="A" THEN GO TO 40
00
5020 IF INKEY$="R" THEN GO TO 5
00
5030 IF INKEY$="S" THEN GO TO 50
50
5040 GO TO 5010
5050 INPUT "FILE NAME ";N$: IF L
EN (N$)<10 THEN GO TO 5050
5060 LET Z=PEEK 65518+256*PEEK
65519-32768
5070 SAVE N$CODE 32768,18 VERIFY ""CODD
ATA": SAVE N$CODE 32768,J, SAVE "
E VERIFY ""CODE
5080 GO TO 5000
5090 INPUT "FILE NAME ";N$: IF
LEN (N$)<10 THEN GO TO 5090
5100 LOAD N$CODE : LOAD ""CODE
: GO TO 4000
```

Listing 2.

```
 10 DEF FN H(H$)=16*(CODE H$(1)
-48-(7 AND H$(1)>"9"))+CODE H$(2
)-48-(7 AND H$(2)>"9")
 20 FOR N=65400 TO 65460 STEP 8
 30 LET TOT=0
 40 PRINT N,"",
 45 INPUT H$: PRINT H$;
 50 FOR B=1 TO LEN H$ STEP 2
 60 LET Z=FN H(H$): LET TOT=TOT
+Z
 70 POKE N+((B-1)/2),Z
 80 LET H$=H$(3 TO )
 90 NEXT B
 100 PRINT " = ";: INPUT T: PRIN
T T
 110 IF TOT<>T THEN PRINT "INPUT
ERROR - TRY AGAIN": GO TO 30
 120 NEXT N
```

Listing 3.

```
65400: 1100402AFCFF1A77 = 775
65408: 2313EB06003E00BE = 547
65416: C28BFF23E5E5CCA = 1179
65424: A2FF043EFFB8CA9B = 1279
65432: FF18EA75EB7783C3 = 1217
65440: 7EFC78E77823E2FF = 1178
65448: FFC911004028FCFF = 1086
65456: 7E1223133E579ADA = 711
65464: CFFF463E00B8CACB = 1183
65472: FF3E0012131DF423 = 649
65480: C3B0FF23C3B0FFC9 = 1488
```

WAVES

Timothy Closs with a Spectrum program to make you sea-sick.

HOW MANY TIMES have you wanted to show off your new computer but have had nothing more to boast than a load of boring arcade games? Well now you can impress everyone with a stunning graphics display using Waves.

Waves allows a "net" pattern — see examples — to be transformed into another net pattern in a smooth, nine frame animation sequence. It is easy to use, but results can be stunning. When Run, Waves will display the message:

PRESS L TO LOAD FRAMES
ANY OTHER KEY TO CONTINUE

If you wish to load some frames from tape, press L and enter the name of the file to be loaded — otherwise press any other key.

A cross will then be displayed on the screen. The lower edge of your first pattern must now be drawn — see controls. When your edge is finished the cursor will move up into the top right hand box and your second edge must be drawn.

The screen will then be cleared and the same process must be repeated for the edges of your second pattern. The main controls are:

5 cursor down at a 45 degree angle
6 cursor down at a 22.5 degree angle
8 cursor up at a 45 degree angle
7 cursor up at a 22.5 degree angle
9 cursor across in a straight line

In addition to these basic controls, however, a sine wave can be drawn by pressing 1.

Also, pressing 0 will copy the edge from the bottom left box into the top right box.

Now that all the edges have been entered, Waves will come up with the question "South to North?". Pressing Y will mean that your net patterns will have lines drawn from the bottom edge to the top edge.

If you reply Y to the following question, "West to East?", your patterns will have 10 intermediate lines drawn from the left of the screen to the right. If you reply Y to both questions you will have criss-cross net patterns.

You can escape from the graphical display by pressing E. The program will then print the message:

PRESS S TO SAVE FRAMES
R TO RESTART PROGRAM
A TO SEE ANIMATION

To enter Waves, first type in the Basic program in listing 1 and save it by typing:

SAVE "WAVES" LINE 4

New the program and type in listing 2. Run this program and type in the hex code in listing 3, remembering to enter the checksum at the end of each line. Now save this code directly after the Basic program by typing:

SAVE "WAVECODE" CODE 65400,100

Now rewind the tape, type

LOAD "WAVES"

and you are ready to start using Waves!

If you do not wish to type in the program and code, simply send a blank tape, SAE and £1 to me at: 5 Western Drive, Shepperton, Middlesex TW17 8HJ for a copy of Waves plus an example of what the program can do. ■

MOVING SC

Rae West explains a routine which will switch between screens for animation or Help pages.

SWITCH ON your 64; the screen memory starts at 1024 — hex 0400 — so that, for example,

POKE 1024,1

puts an A in the extreme top-left corner — older 64s may need colour Ram to be poked too. Right? For most purposes, this is assumed to be a fixed feature of the 64.

What's less well known is that the screen can be repositioned through most of the machine's 64K of Ram. The diagram shows the normal situation, with about 39000 bytes of Basic positioned between the top of the screen — $08000 — and Rom at $A000. But we can move the screen, in minimum steps of $0400, anywhere in memory.

Screens under Rom

Some locations aren't suitable, as machine-language programmers will appreciate — for example the zero-page, at the very start of memory, cannot be used as a normal screen. My example puts screens under Rom, partly because many programmers don't know how to use this area (machine language is usually needed), so it's usually free, and partly to avoid the complication of altering Basic pointers to prevent programs overlapping the screen area.

"Moving the screen" — what does this mean? Nothing to do with the TV! — we want commands like Print and keys like CLR to work normally, but to have freedom to alter the actual position in memory that screen information is stored. If we do the job properly, most things will be unaltered, but Pokes to screen, if used, will be different — the addresses will be much larger than usual since the screen Ram is higher up.

Before we continue, it makes sense to ask why anyone should want to move the screen around. In fact, there are several tricks we can perform with this method, which are impossible otherwise:

- We can switch between screens at will. For example, a Help screen might be permanently set up; a keypress would allow instantaneous switching between conventional processing and such a screen.
- Animation is another possibility: there's room for 16 screens in Bank 1, plus 12K of Basic below them, enough for attractive animation of the piston-engine demo type.
- Screens of user-defined graphics and normal characters can be alternated.

Using interrupt techniques, we can mix screens on the same display.

Attractive patterns

My demonstration program puts four user-defined characters in Ram; these are designed to fit together to produce attractive patterns. The program uses two screens — Apple users will know the kind of thing — Apple has two alternate screens. It fills one screen, displays it, then repeats with the other, so there's no delay while one pattern is overwritten with the next. The result is quite impressive.

Vic-II is the key to the action, and it's necessary to get several things right, which is why the technique isn't too simple. As the diagram shows, Vic-II can be programmed to process only a quarter of the 64's memory at one time. All the character definition information — i.e. patterns of 8 by 8 dots — and the screen Ram, and sprite information must be stored within this 16K. The only exception is the 64's Rom character set, which is wired up to override this requirement.

Moving the screen

So, to move the screen under Rom, we must (i) Set Vic-II to bank 2 or 3; (ii) Set Vic-II to read the character set we want; and (iii) ensure Basic writes to our new screen. This last item

Table 1.

Usable Character Definition and Screen Combinations

Vic Bank 0: selected with POKE 56576,(PEEK(56576)AND 252) OR 3 (DEFAULT) (usual value is 151)

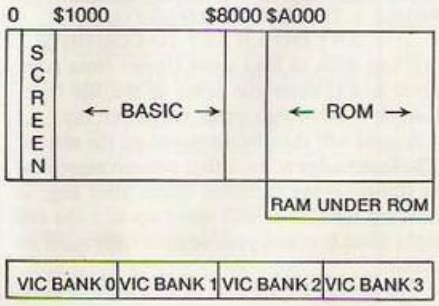
Start of Screen Memory	POKE 648** with	Start of Graphics Character Memory: 2048	ROM char set U.CASE 4096	ROM char set L.CASE 6144	8291*	10240	12288	14336
		POKE 53272 with:						
1024	4	19	21	23	25	27	29	31
2048	8	35	37	39	41	43	45	47
3072	12	51	53	55	57	59	61	63
The screen cannot be placed at 4096-8191, as the Vic sees character ROM here.								
8192	32	131	133	135	137	139	141	143
9216	36	147	149	151	153	155	157	159
10240	40	163	165	167	169	171	173	175
11264	44	179	181	183	185	187	189	191
12288	48	195	197	199	201	203	205	207
13312	52	211	213	215	217	219	221	223
14336	56	227	229	231	233	235	237	239
15360	60	243	245	247	249	251	253	255

*Starred columns correspond to bit-map graphics.
**Not needed with bit-map graphics.

Vic Bank 1: selected with POKE 56576,(PEEK(56576)AND 252) OR 2 (usual value is 150)

Start of Screen Memory	POKE 648 with	Start of Graphics Character Memory: 16384*	18432	20480	22528	24576*	26624	28672	30720
		POKE 53272 with:							
16384	64	1	3	5	7	9	11	13	15
17408	68	17	19	21	23	25	27	29	31
18432	72	33	35	37	39	41	43	45	47
19456	76	49	51	53	55	57	59	61	63
20480	80	65	67	69	71	73	75	77	79
21504	84	81	83	85	87	89	91	93	95
22528	88	97	99	101	103	105	107	109	111
23552	92	113	115	117	119	121	123	125	127
24576	96	129	131	133	135	137	139	141	143
25600	100	145	147	149	151	153	155	157	159
26624	104	161	163	165	167	169	171	173	175
27648	108	177	179	181	183	185	187	189	191
28672	112	193	195	197	199	201	203	205	207
29696	116	209	211	213	215	217	219	221	223
30720	120	225	227	229	231	233	235	237	239
31744	124	241	243	245	247	249	251	253	255

Figure 1.



REENS

relies on location 648.

PRINT PEEK (648)

usually returns 4, showing the screen starts at $0400.

Memory arrangements

Table 1 — which, so far as I know, hasn't been printed before — summaries the 64's screen memory arrangements. You should be able to see from it that my example puts character definitions from 49152 onwards, and uses two screens, starting at 50176 and 51200, which it switches between. While Print takes place, the "wrong" value of 648 is used, which makes the 64 display the alternative screen.

Incidentally, sprites are usable with this method; sprite pointers are hidden away just above the screen, so when a screen is moved these pointers shift too. One final word: when experimenting, Stop-Restore won't change location 648. So if your cursor seems to have vanished, try

POKE 648,4

to return to normal. ■

Rae West has written a 600 page reference book, *Programming the Commodore 64*, recently published by Level Ltd. It is obtainable from booksellers or by mail from Biblios Distribution, Star Road, Partridge Green, Nr Horsham, W. Sussex at £14.90 plus £1 post.

Vic Bank 2: selected with POKE 56576,(PEEK(56576)AND 252) OR 1
(usual value is 149)

Start of Screen Memory	POKE 648 with	Start of Graphics Character Memory: ROM char set U.CASE 32768*	34816	36864	L.CASE 38912	40960*	43008	45056	47104
		POKE 53272 with:							
32768	128	1	3	5	7	9	11	13	15
33792	132	17	19	21	23	25	27	29	31
34816	136	33	35	37	39	41	43	45	47
35840	140	49	51	53	55	57	59	61	63

The screen cannot be placed at 36864-40959, as the Vic sees character Rom here.

Above this point in this bank, Ram and Basic Rom co-exist in the memory map; the Vic "sees" the Ram, not the Rom, but the routines that perform screen operations need to read from screen Ram; they can't do so, in this region, without first switching out the Roms and switching in the Ram. This isn't normally done — it can only be done if Basic is not in use. So this area cannot effectively be used for screen Ram. Note, however, that it can be used to store character definitions, since these don't need to be read back, as the Vic chip will read these from Ram while the 6510 reads instructions from the parallel Rom containing Basic.

Vic Bank 3: selected with POKE 56576,(PEEK(56576)AND 252)
(usual value is 148)

Note: only the region of memory $C000-$CFFF (49152-53247) can be used as screen RAM: see the comments above.

Start of Screen Memory	POKE 648 with	Start of Graphics Character Memory: Caution: I/O chips 49152*	51200	53248	55296	57344*	59392	61440	63488
		POKE 53272 with:							
49152	192	1	3	5	7	9	11	13	15
50176	196	17	19	21	23	25	27	29	31
51200	200	33	35	37	39	41	43	45	47
52224	204	49	51	53	55	57	59	61	63

To use these tables:

(i) To determine screen start and graphics definition start, Peek contents of 648 and 53272, then refer to the table. Example: when 648 contains 140 and 53272 contains 53, screen Ram starts at 35840 and Rom characters at 36864. Bank 2 is in use; this can be deduced from the position of screen Ram given in 648.

(ii) To set screenstart and graphics definitions, Poke all three parameters, unless already set. Example: POKE 56576, (PEEK(56576)AND252)OR 2: POKE 648,120: POKE 53272,252 selects bank 1, puts screen at 30720 and chooses user-definable characters at 28672. In Basic, POKE 56,28672/256: CLR or POKE 56,112: CLR lowers the top of Basic to protect the definitions and screen.

(iii) To move the normal character definitions, use POKE 56333,127: POKE 1,51 followed by a loop to transfer 53248-57343 (or a subset) to the new position, then POKE 1,55: POKE 56333,129. All this must be in program mode. This method is easier than defining all the characters from scratch.

(iv) The Vic-II's bank-switching forces both screen and character definitions to coexist in the same quarter of the 64's memory map. It's perfectly OK to start the screen up at 49152, and store character definitions in the Ram from 61440, say, taking nothing from Basic. Many character sets can be stored simultaneously, in fact.

Demo program.

```
0 REM *** 'YOUR COMPUTER' - DEMONSTRATION OF TWO C64 SCREENS ***
10 POKE 56576,148 : REM VIC BANK 3
20 S$="@ABC"      : REM 4 CHARACTERS
30 FOR J=49152 TO 49183: READ X: POKE J,X: NEXT: REM SET UP USER DEFINED CHARS
40 DATA 36,36,255,0,0,255,36,36
50 DATA 36,36,231,36,36,231,36,36
60 DATA 36,18,9,132,66,33,144,72
70 DATA 36,72,144,33,66,132,9,18
99 REM **** NOW WE DISPLAY ONE SCREEN, WHILE WRITING TO THE OTHER:- ****
100 GOSUB 1000: POKE 53272,17: POKE 648,200: REM ONE SCREEN ...
110 GOSUB 1000: POKE 53272,33: POKE 648,196: REM ... OTHER SCREEN!
120 GOTO 100
999 REM **** MAKE A RANDOM STRING OF LENGTH 9 FROM THE 4 CHARACTERS:- ****
1000 X$="": FOR J=1 TO 9: L=RND(1)*4+1
1010 X$=X$+MID$(S$,L,1): NEXT
1020 PRINT "▒": FOR J=1 TO 111: PRINT X$;: NEXT
1030 RETURN
```

The English Computer Shop

WILLEM OGIERPLEIN 2
B-2000 ANTWERPEN
Tel. 03/233 59 06

GRETRYSTRAAT 31
1000 BRUSSEL
Tel. 02/218 60 26

Schneider
AMSTRAD
sinclair
apricot
ACORN COMPUTER

EEN BRIT MET BIT!

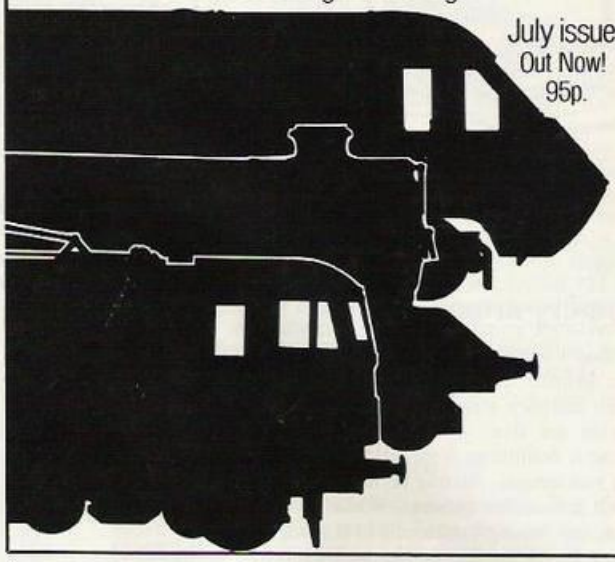
Railway MAGAZINE
STEAM·DIESEL·ELECTRIC

The glorious past — The challenging future

The new, bigger Railway Magazine brings the whole world of railways alive

This month we feature: Two-Routes to Skegness and West Highland Freight

July issue. Out Now! 95p.



SKC®

PERFECTION ASSURED FLOPPY DISK MEET ANSI, DIN, ECMA, IBM, JIS AND SHUGART SPECIFICATIONS.

MINI FLOPPY DISK

EVERY DISK IS CERTIFIED AND GUARANTEED TO BE 100% ERROR FREE

LOW PRICE - HIGH QUALITY

40 TRACK BOXES OF 10
S/S S/D.....10.50
S/S D/D.....11.00
D/S D/D.....13.00
80 TRACK
S/S D/D.....15.00
D/S D/D.....16.90

ADD V.A.T. TO ALL PRICES
PLEASE ADD £1 POST/ PACKING

40 TRACK ✸LOOK—SPECIAL BULK PRICES✸
S/S S/D.....88p
S/S D/D.....94p
D/S D/D.....1.05
80 TRACK
S/S D/D.....1.21
D/S D/D.....1.38

PER DISC

MIN. 600 DISCS PER BOX
ADD V.A.T. TO ALL PRICES
CARRIAGE FREE FOR 'BULK' ORDERS

ALSO COMPUTER CASSETTES
BOXES OF 100
C10.....£23
C15.....£24
C20.....£25

ADD VAT TO ALL PRICES
PLEASE ADD £3.50 POST/PACKING

★ C15 BULK TAPE PRICES AVAILABLE ★

P.V. TUBES
Dept D
104 ABBEY STREET, ACCRINGTON, LANCS BB5 1EE.
Tel: (0254) 36521. (0254) 32611
Telex: 635562 Griffin G for PV

CARRIAGE ON EXPORTS AT COST

Phone in Access/Visa card no. for same day dispatch

Self Adhesive Cassette & Disk Labels

★ 3" & 3½" COMPACT DISK LABELS
★ SINCLAIR MICRODRIVE LABELS
(ON TRACTOR FEED BACKING PAPER)
★ 24 HOUR SERVICE FROM STOCK

CASSETTE LABELS ON A4 SHEETS - White only, suitable for printing by offset litho or photocopying: 100 labels - £3.50; 200 - £6.00; 500 - £12.00; 1000 -£21.85

CASSETTE LABELS IN ROLLS - Complete with tractor feed backing paper for overprinting by computer printer. Available white or tinted blue, pink, green, orange, yellow, grey, peach, or cream. Minimum order 500 labels.
WHITE: 500 - £14.66; 1000 - £20.70; TINTED: 500 - £16.90; 1000 - £24.15

DISK LABELS - All labels are on tractor feed rolls with tints as above. 95 x 36 mm. WHITE: 500 - £12.75; 1000 - £17.75; TINTED: 500 -£15.20; 1000 - £24.65

3" & 3½" COMPACT DISK LABELS - 70 x 69 mm. white or tints as above. WHITE: 500 - £15.55; 1000 -£22.05; TINTED: 500 - £21.35; 1000 - £31.05

SINCLAIR MICRODRIVE LABELS - Side label 28 x 19 mm., Spine label 31 x 5 mm. Labels laid out side by side on tractor feed backing paper.
WHITE: 1000 - £12.15; 2000 -£18.72; TINTED: 1000 - £16.64; 2000 - £32.52

PRICES INC. VAT & CARRIAGE. SEND STAMP FOR SAMPLES & PRICE LIST WITH DETAILS OF QUANTITY DISCOUNTS.

Industrial Process

UNIT A4, SMEED-DEAN CENTRE
EUROLINK INDUSTRIAL ESTATE
SITTINGBOURNE, KENT ME10 3RN
Sittingbourne (0795) 28425 - 24 hrs

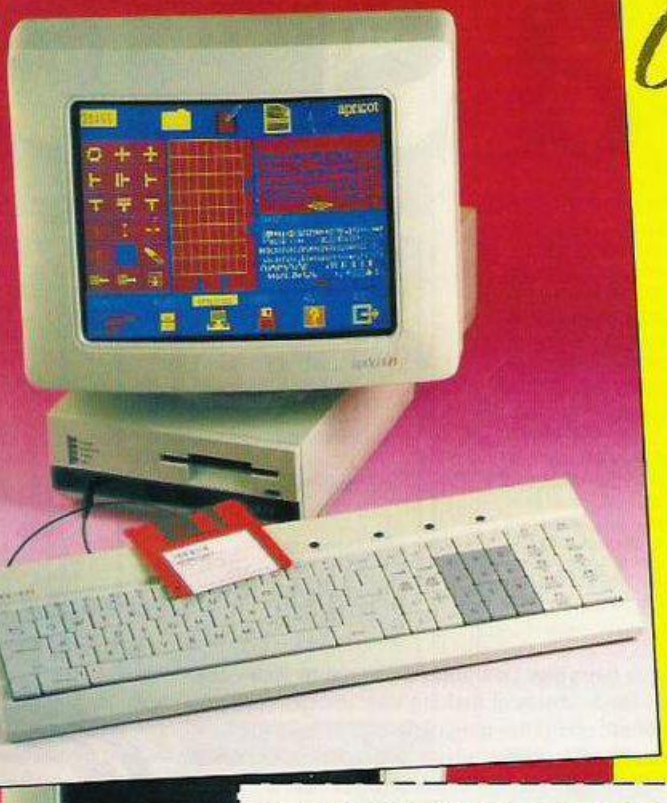
SELF ADHESIVE COMPUTER LABELS - Superfast

£2500 OF ACT PRIZES

Competition

WIN

This £700 Apricot F1E including disc drive plus a £400 colour monitor



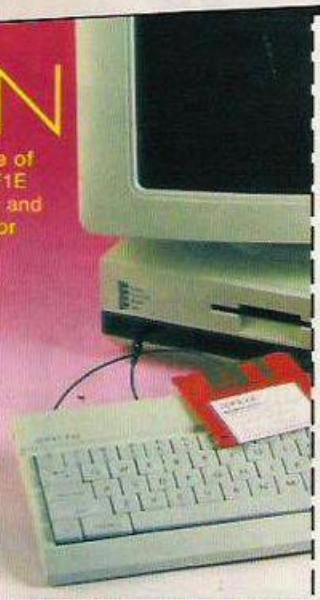
Write a school report on your existing computer and win a 16-bit F1E

RULES

- The winners of the competition will be the people who, in the view of the editor, come up with the most amusing or clever ideas for a computer school report.
- The names of the winner will be printed in the October issue of *Your Computer*.
- All entries must arrive at the *Your Computer* offices by the last working day in July 1985.
- Each person may enter the competition only once.
- Entries to the competition cannot be acknowledged.
- No employees of BPI or their relatives may enter the competition.
- The decision of the editor is final.
- No correspondence on the result of the competition will be entered into.
- BPI assumes no responsibility or liability for any complaints arising from this competition.

WIN

Second prize of an Apricot F1E with a black and white monitor



WIN

Third prize will pick an Apricot F1E

SCHOOL REPORT

Don't forget to enclose this coupon or a photocopy of it, when you send in your school report for your existing computer, or for a personality in the home micro market, to *Your Computer* Room L221, Quadrant House, The Quadrant, Sutton, Surrey SM2 5AS.

Your name _____

Your address _____

_____

Name of pupil _____ Age _____

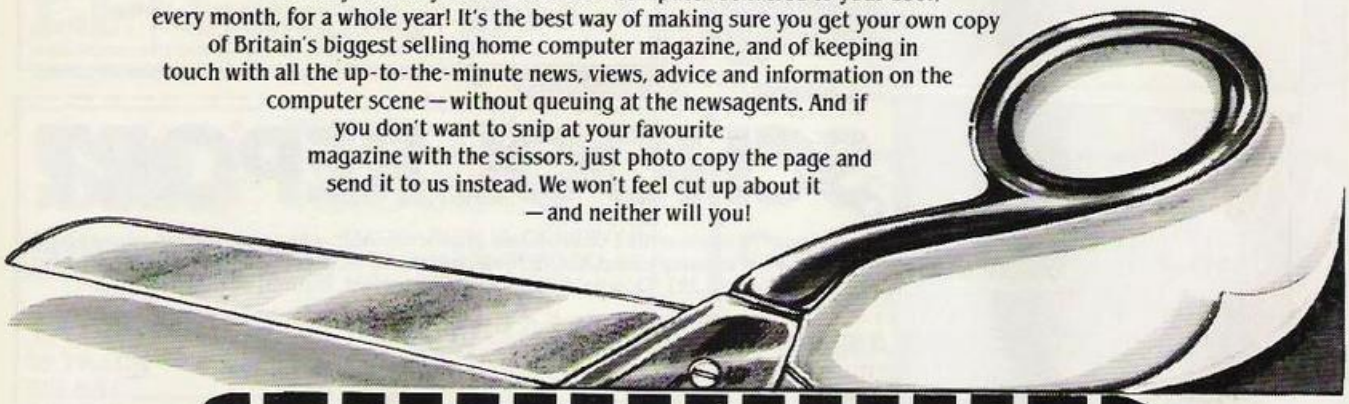
Subject	Comments	Place in Class

What could you do with an Apricot FIE that you cannot do at the moment? _____

_____

It's a snip.

For only £14.00 you can have Your Computer delivered to your door, every month, for a whole year! It's the best way of making sure you get your own copy of Britain's biggest selling home computer magazine, and of keeping in touch with all the up-to-the-minute news, views, advice and information on the computer scene—without queuing at the newsagents. And if you don't want to snip at your favourite magazine with the scissors, just photo copy the page and send it to us instead. We won't feel cut up about it —and neither will you!



YOUR COMPUTER

Please send me YOUR COMPUTER each month for 12 months.

A. I enclose cheque/PO to the value of £14.00 (UK), £22.50 (Overseas). Cheques should be made payable to Business Press International Ltd. Air mail rates available on request.

B. Please debit my credit card account:

Enter number: ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

(please tick)

Access ☐ Barclaycard/Visa ☐ Diners Club ☐ American Express ☐

Signed..... Date.....

SUBSCRIPTION ORDER FORM

NAME:.....

ADDRESS:.....

.....

Job Title (if any).....

Type of Business (if any).....

Do you own a computer? Yes No

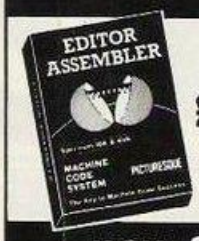
Do you have access to a computer? Yes No

If so please state type.....

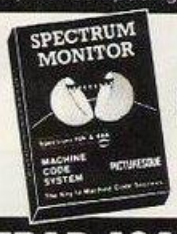
Please return to: Your Computer, Subscription Manager, Business Press International Ltd., Oakfield House, Perrymount Road, HAYWARDS HEATH, Sussex RH16 3DH.

YOUR COMPUTER

"...a jewel of Spectrum programming..."
(Popular Computing Weekly)



£8.50
INCL. VAT & P&P.



£7.50
INCL. VAT & P&P.

...now for AMSTRAD 464/664

* Assembler & Monitor in one package
* Many new features
* Fully relocatable
* Supplied on cassette — back up option to Disc
* Fully Disc compatible
* Plus much more

£19.95

PICTURESQUE
PICTURESQUE
PICTURESQUE
PICTURESQUE

THE CODE MACHINE

AMSTRAD CPC464/664

ASSEMBLER + MONITOR

PICTURESQUE
PICTURESQUE
PICTURESQUE
PICTURESQUE
THE MACHINE CODE SPECIALISTS

Fast Mail Order from: Send SAE for full details

PICTURESQUE (Dept YC), 6 Corkscrew Hill, West Wickham, Kent

PRICE EXPLOSION FOR JULY

All inclusive
ALPHACOM 81 OFFER
(subject to availability)

£75

80 COLUMN THERMAL PRINTER
Quiet operation, 100 c.p.s., full graphic capability, self test mode, paper feed button. Many units in operation throughout UK.

Interfaced to COMMODORE 64/VIC 20, ATARI, BBC B (state which required)*

Please rush me ___ Printers interfaced to * at £75 each, inclusive of VAT, p&p. Access or Barclaycard or cheque/PO enclosed
No. .....
Name .....
.....
.....
Postcode .....

DEAN ELECTRONICS LIMITED
Glendale Park Fernbank Road
Ascot Berkshire SL5 8JB
Tel. 0344 885661
Telex 849242

THE TYPING MASTER

(The Keyboard Skills program that puts you in a class of your own)

- **'The Typing Master'** program exists to teach you to type. The easily met target is 30 words per minute with 95% accuracy after 30 half-hour sessions. The following facilities help you to accomplish this standard.
- **'Sight & Type'** introduces you to the keyboard with the correct finger for each key and takes you to a speed of around 12 words per minute.
- **'Touch-Typing'** takes your speed to around 24 words per minute at the same time ensuring that you learn the peripheral keys to the same standard as those more commonly used.
- **'Practice Exercises'** gives Non-Timed accuracy oriented exercises and Timed speed/accuracy exercises. Your results are given in words per minute and percent accuracy. The target standard of 30 words per minute (and far beyond) is achieved with this module.
- **'Session Monitor'** overlays the whole program to hold your hand all the way through the course from first use of the program to that final, very useful result.
- To back up this Basic version you get documentation on how to approach the course and a record card to fill-in as you progress through the sessions.
- **'The Typing Master'** is not a toy. It is a professionally-written program which has as its sole purpose the teaching of typing/keyboard skills in a way that is friendly and fun. It was written by a typing instructor and it has been marketed world-wide on CP/M, MSDOS, PCDOS and other operating system-based machines over the past three years. It has also been available on Newbrain and BBC Micro (Model A or B) for over a year and is now being released for Amstrad CPC (mono or colour), Commodore 64 and Sinclair QL!
- TAPE formats of the Basic version are available from the following selected list of distributors (media and prices are shown in brackets).

NEWBRAIN (Cassette: £15.00 (no VAT)):
GFG Microsystems, 36 Armitage Way, King's Hedges, Cambridge, CB4 2UE. Tel. (0223) 315120.

BBC MICRO (model A or B) (Cassette, usable with disk: £15.00 + VAT)
AMSTRAD CPC (mono or colour) (Cassette: £15.00 + VAT).
E.C.H. Hobday, The Chestnuts, Rodmersham, Sittingbourne, Kent ME9 0PL. Tel. (0795) 24191.
COMMODORE 64 (Cassette: £15.00 + VAT).
SINCLAIR QL (Cartridge: £20.00 + VAT).
P. Ashpitel, 36 Athlone Avenue, Bury, Lancashire, BL9 5EE. Tel. (061-797) 5214.

Please send me _____ copies of **THE TYPING MASTER (Basic Version)**

for the _____ computer at £_____ per copy (+VAT where shown). I enclose cheque/postal order for total amount:

£_____

NAME: _____

ADDRESS: _____

PLEASE SEND THE COMPLETED COUPON AND PAYMENT DIRECT TO THE DISTRIBUTOR FOR *YOUR COMPUTER* AS SHOWN ABOVE.

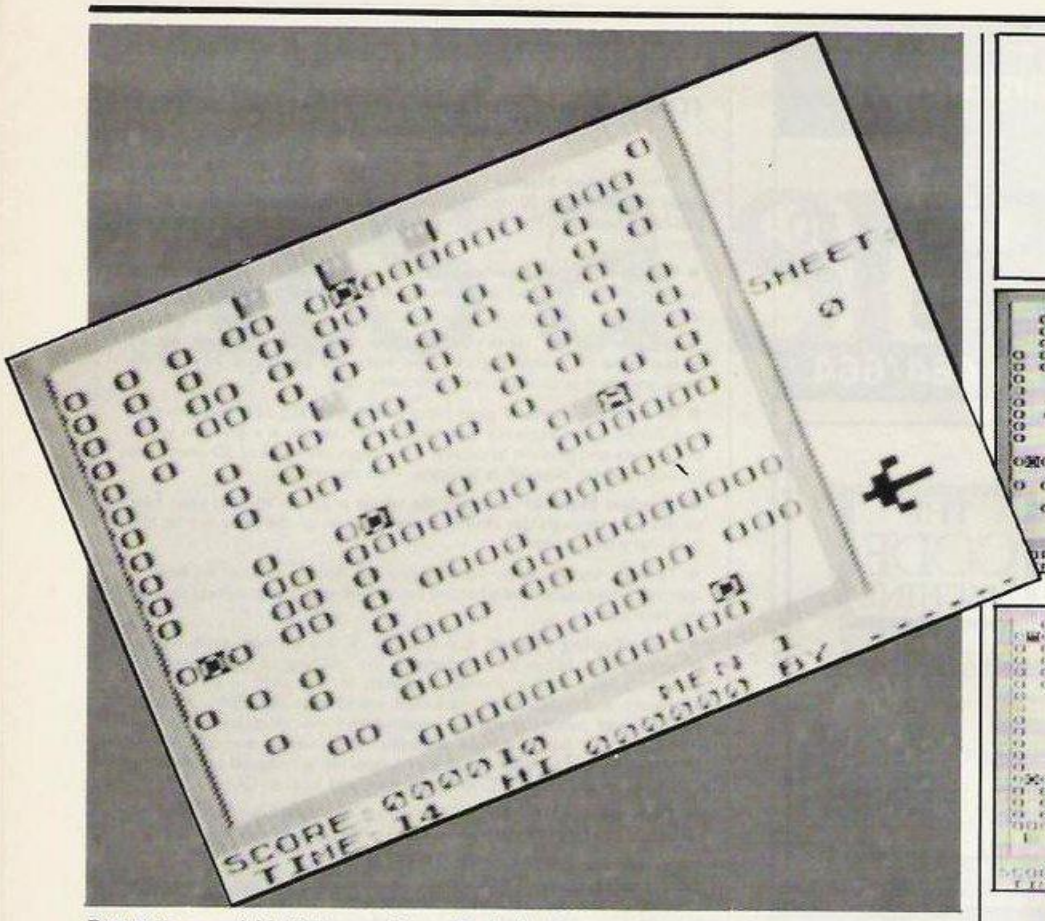
- DISK formats of the Basic program may be obtained from the following suppliers. They also supply a Business/Schools version which incorporates record keeping and many other facilities. Prices shown below are for the Basic version.

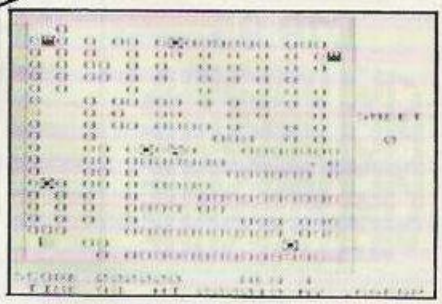
APRICOT, SIRIUS & VICTOR (tailored versions). (Disk: £50.00 + VAT).
Anglia Business Computers, 1 Milton Road, Cambridge, CB4 1UY. Tel. (0223) 315580.
CP/M80, CP/M86, MSDOS, PCDOS. (Disk: £50.00 + VAT).
Microcomputer Products International Limited, Central House, Cambridge Road, Barking, Essex, IG11 8NT. Tel. (01-591) 6511.
or,
Software Limited, No. 2 Alice Owen Technology Centre, 251 Goswell Road, London, EC1. Tel. (01-833) 1173.

In case of difficulty write to:

ANTHONY ASHPITEL SOFTWARE SYSTEMS
56 London Road, Harleston, Norfolk, IP20 9BZ, England.

PO





Miquel Van Smoorenburg with a ZX-81 game featuring that character we all know and love — the amiable little inverse A who tries to survive against the psychotic tendencies of four nasty inverse 0s.

PONGY IS an amiable little penguin — thanks to the chunky ZX-81 graphics an amiable little inverse letter A — that has to collect diamond ice-blocks. Not particularly served by four sno-bees.

To enter the game, first, you have to create a Rem line with enough characters to hold the machine-code. You can do this very easily: Enter a line 1 like this

1 PRINT 0+0+0+0+0+0+0+.. etc.

until you have typed 43 zeros. Check the line by typing

PRINT PEEK 16511 + 256*PEEK 16512.

This should give 345. If not, accord your print statement. Then edit this line eight times, until you have lines 1 to 9. Now enter the following commands:

```
POKE 16510,0
POKE 16511,65
POKE 16512,12
POKE 16513,118
POKE 16514,118
POKE 16419,5
5 SAVE "PONGY"
```

Don't type Newline during the poking to obtain a listing or the computer will crash! If it does crash, switch your 81 off and try again. If everything is OK, enter the hexloader and the hexcodes as usual. Now save it, for security, and delete the hex-loader. Enter lines 10-50 from the Basic listing, and enter Run 10. The game should start. You can break out of the game by pressing Break during the title-screen. Typing Run will autosave the game. The speed of the game is changeable:

the Poke in line 10 controls sno-bee speed
the Poke in line 20 controls timer-speed and
the list in line 30 controls pongy-speed.

Decreasing the values will increase the speed. Changing pongy-speed also affects the timer. It is also possible to change the number of lives you have, to a maximum of 9, by typing POKE 18006, 28+ (number of lives)

If you are interested in creating your own Pongy screen layouts, you have to enter lines 100-430. Enter Run 100, and you are to create your own layout.

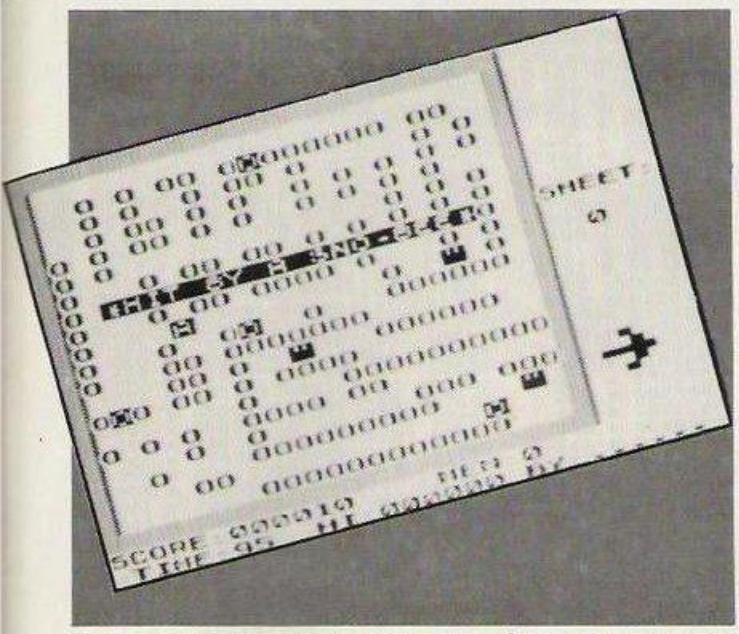
Use cursor keys to move. If you are satisfied, press 0 and enter the screen-number: 1 to 4. Then you can place the diamonds wherever you wish, use 0 to enter. After you have entered four diamonds, the program stops. You can then watch the result of your action by typing Run 10.

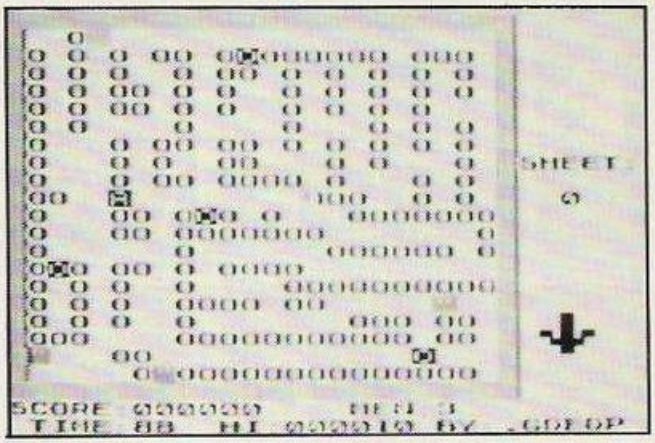
You start the game in the middle of the screen. Your task is to connect three or more diamonds — inverse 0's — in one straight line. Movement is made with the arrow keys, and the direction of Pongy is shown by one big

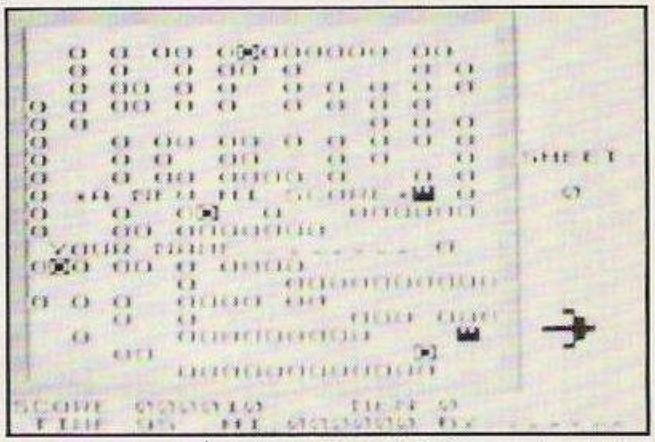
Hex loader.

```
  5 REM HEXLOADER
 10 PRINT "START ADDRESS"
 20 INPUT S
 30 PRINT "FINISH ADDRESS"
 40 INPUT F
 50 FOR N=S TO F STEP 8
 60 LET T=0
 70 PRINT N;": ";
 80 INPUT A$
 90 PRINT A$;" = ";
100 INPUT TOT
110 PRINT TOT
115 IF PEEK 16422=2 THEN SCROLL
120 LET Z=0
130 FOR K=1 TO LEN A$ STEP 2
140 LET C=(CODE A$(K)-28)*16+CO
DE A$(K+1)-28
150 LET T=T+C
160 POKE N+Z,C
170 LET Z=Z+1
180 NEXT K
190 IF TOT=T THEN GOTO 220
200 PRINT "ERROR - PLEASE INPUT
AGAIN"
205 IF PEEK 16442=2 THEN SCROLL
210 GOTO 60
220 NEXT N
```

NGY







arrow on the left hand side of the screen.

To move blocks, position Pongy against the block you want to move and press 0. If another block, or the wall, is behind the block it will be grinded to powder — keep 0 pressed — unless it is a diamond. You can kill the sno-bees by squashing them with a block and 10 points are gained for that. However the sno-bees will re-appear in the left-hand corner.

If you have succeeded in positioning three or more blocks in one straight line, you get a bonus of 10xtime left, and when time reaches zero, you move on to the next sheet. In total there are four different sheets. When you are out of lives, the game ends. You can also abort the game by pressing Break. If the high-score is beaten, the computer will ask you to enter your name — don't forget to press Newline. Answering the question "another game?" with N will bring you back to the title screen.

It is possible to hold the game by pressing H. Press another key to continue.

If you don't feel up to the task of typing in the listings, or you cannot manage to get the program to work — not very likely — the game is available on a fresh cassette tape for £10 — Dutch guilders, or £3 — from Miquel Van Smoorenburg, 20 Baljuwstraat, 2461 sl Ter-Aar, Holland.

(hex dump on next page)

Listing 1.

```
   5 SAVE "PONGY"
  10 POKE 16508,5
  20 POKE 16507,6
  30 LIST 4000
  40 RAND USR 17971
  50 REM *DONT FORGET THIS LINE*
  60 REM
 100 REM ONLY ENTER THE FOLLOW
 ING LINES IF YOU WANT TO DEFINE
YOUR OWN SHEETS.
 110 LET A$="
"
 120 PRINT AT 0,0;A$;AT 21,0;A$
 130 FOR X=1 TO 20
 140 PRINT AT X,0;"0000000000000
000000000"
 150 NEXT X
 160 LET P=PEEK 16396+PEEK 16397
*256+35
 170 LET P1=P
 180 LET K$=INKEY$
 190 LET P=P+(K$="8")-(K$="5")+3
3*((K$="6")-(K$="7"))
 200 IF PEEK P=136 THEN LET P=P1
 210 POKE P1,0
 220 IF K$="0" THEN GOTO 250
 230 POKE P,166
 240 GOTO 170
 250 INPUT A
 260 IF A<1 OR A>4 THEN GOTO 250
 270 RAND A
 280 LET A=USR 17974
 285 LET X=1
 290 LET Y=1
 295 LET A$=" "
 300 PRINT AT X,Y;
 305 FOR N=1 TO 4
 310 PRINT A$;AT X,Y;
 320 LET A$=CHR$ (PEEK (PEEK 163
98+PEEK 16399*256))
 325 PRINT "";AT X,Y;
 330 LET K$=INKEY$
 340 LET X=X+(K$="6" AND X<20)-(
K$="7" AND X>1)
 350 LET Y=Y+(K$="8" AND Y<22)-(
K$="5" AND Y>1)
 360 IF K$<>"0" THEN GOTO 310
 370 POKE A,X
 380 POKE A+1,Y
 390 LET A=A+2
 400 LET A$=""
 405 IF INKEY$>"" THEN GOTO 405
 410 NEXT N
 420 PRINT AT X,Y;A$
 430 PRINT AT 21,3;">READY"
A000    ----P-O-N-G-Y--------
  (C) MIQUEL VAN SMOORENBURG
  JANUARI-FEBRUARI 1985.
```

Hex dump.

```
16514: 7576C36844C3FF44 = 1121
16524: 3C3E3A2A51003B = 358
16530: 1B381B00332E5C = 322
16538: 0E32D3E0026372A = 316
16546: 003E343A003134 = 325
16554: 302E33C000E33339 = 343
16562: 3440332E003734 = 324
16570: 2C37263200FF0031 = 851
16578: 2E3839A33003934 = 372
16586: 002B2C392D002E33 = 286
16594: 3B39282629181B = 315
16602: 1BD450AB4101BC = 743
16610: 5002011652040 1E7 = 423
16618: 5103020000FFFF21 = 629
16626: 00D1FF0100040201 = 486
16634: 0303E5400000000 = 302
16642: 010000C95100015E = 372
16650: 04F7407E4F870100 = 656
16658: 8682010001000500 = 142
16666: 8682010007F8200 = 531
16674: 0105010001000E58 = 142
16682: 0354010001E521ED = 635
16690: 40FE05300587160 = 533
16698: 5F19E5223E1C9E5 = 990
16706: ED4B254079FEFF28 = 1083
16714: 04CDBD077E320141 = 647
16722: D620CD2F41ED53FF = 1138
16730: 4078A72B04ED5D2 = 720
16738: 413EEFDBFE2FFE01 = 1117
16746: 32FE40E1C93A0141 = 918
16754: D621FE04D058787 = 1118
16762: 0600AFE210F4109ED = 444
16770: 5B05413010D0ED6D = 573
16778: ED011E0009C5EB01 = 705
16786: 0300EDB0C1EB09EB = 1088
16794: 0102000ED0C9E52A = 888
16802: 324DE5E5D1D19ED = 819
16810: 5B344019223E4170 = 505
16818: E1C932FB400D2053 = 919
16826: 22FC40EB3500608 = 653
16834: 32FB4A0C0F411197E = 833
16842: FE0828415DCFA41 = 1010
16850: D1E61FFE10280D7E = 919
16858: FE8B281FEA628D = 987
16866: FE342B0E7282E6D = 843
16874: 52CDA041E6033C10 = 821
16882: CF181AD5CDA041D1 = 1109
16890: E51FFE103EFF20E4 = 1106
16898: 3E0E0E05A7ED52EB = 802
16906: 2AFC4071EB7EFFE6 = 1252
16914: 2004237C40366B = 1278
16922: C921DD400604C5E5 = 955
16930: 6E23E5237E234ECD = 694
16938: E441EBE1723723 = 1004
16946: 3AFB4077232 3C110 = 1207
16954: E5C9CD4141ADB40 = 1090
16962: 3600197EA72807FE = 673
16970: 6E2B0323E4102DB = 760
16978: 4036A6C9010000E3 = 573
16986: 3AFE40A728F62ADB = 1090
16994: 40ED4B0241097E5F = 673
17002: FE0B2E0E3FFE3A = 907
17010: 20E2E5097EE1FE8 = 1207
17018: CA3043E63FFE34CA = 1118
17026: 3043AF32044 1E509 = 647
17034: 7EE2FE0F2E1BE83F = 1103
17042: FE342B1FE0FCCFA = 1080
17050: 423600F173D51120 = 1138
17058: 031B7B6320FBD118 = 847
17066: DDC1FD010000FEB4 = 972
17074: C02B7EFFE8223 = 904
17082: 237EFEB4281B01DE = 885
17090: FF097EFEB4280A01 = 875
17098: 4200DE7FFEB40E00 = 649
17106: C001DFFFF1210019 = 745
17114: 0601FFFF11010009 = 544
17122: 7EFEB428FA010000 = 851
17130: 17E7FFEB428F9C9 = 1087
17138: E1C9E5D5E5D9E5E3 = 1342
17146: DD400604C5E54E23 = 834
17154: 46626BA7ED42E1D5 = 1183
17162: 2B0C23323323D1C1 = 594
17170: 10EAC1D1E1E1D9E1 = 1355
17178: 0C400123000 9EB23 = 471
17186: 237223360123361 0 = 344
17194: 23CD0D4418E07B01 = 693
17202: 000AFFE4C5C3A04 41 = 761
17210: 3C320441FFE4D836 = 707
17218: 08FE07D83600AF32 = 1022
17226: 0441C9ED4B0B410A = 668
17234: 0D2F412A0D41197E = 588
17242: CB7F2A0D03FE0B = 647
17250: 200301F740ED4308 = 1138
17258: 4118E022D41444D = 570
17266: 0906E2DC5CD4D4336 = 895
17274: 88CD4D4433B8CD4D = 957
17282: 433680C110EDCD02 = 959
17290: 34333A380E1C1C1C = 315
17298: 0D5393B000034 00 = 218
17306: 0000AF000000000 = 0
17314: 343400000AFF3230 = 389
17322: 402A0C40114F0119 = 304
17330: E5010E001197 43ED = 716
17338: 1D5E18E9430 10E = 850
17346: 00EDB0E1E5110700 = 891
17354: 19ED4B0541787828 = 737
17362: 15C5E5CD1A44CD73 = 1066
17370: 43E1C110F4ED4B08 = 1065
17378: 41CD0D4410FB11FF = 890
17386: FF1B7A8320FBD121 = 1106
17394: 9743010E00EDB006 = 652
17402: 0D4D4433568C1 = 1018
17410: 10F73EFF2214032 = 777
17418: 3C40C9E52A0C4011 = 689
17426: E10219CD1A44E1C9 = 977
17434: 7EFE1CD8FE26D02 = 1176
17442: FE25C0361C2B18F0 = 1016
17450: 0EFF3A0B413D3208 = 519
17458: 41C0FA3A0B32084 1 = 625
17466: 3A0941D3D3C0FF = 559
17474: 0C4001FF02097EFE = 1169
17482: 1C3800FFE26300935 = 499
17490: FE1CC03625B18EE = 870
17498: 23369C2336C0D02 = 491
17506: 0079323C40C92A0C = 550
17514: 4022D4101F740ED = 725
17522: 1FB43E50177010 9 = 502
17530: 22DB4E1E5014802 = 849
17538: 09220541E1012300 = 574
17546: 0922DD4001150009 = 359
17554: FE1400015E020922 = 463
17562: E540011540092 2F9 = 591
17570: 403E0421DD40233 = 518
17578: 7723360A233D20F6 = 592
17586: 0000003E04320841 = 189
17594: 3E3000000C323C40 = 335
17602: DDE5F1FE02C0021 = 1393
17610: CD44C9ED5F010119 = 833
17618: 3EF5CDB502CD9202 = 1048
17626: 0D2E0D2E1CD44F3 = 1009
17634: 3A3C40A7CA4A6C3 = 775
17642: 0A413D320A41C2A4 = 919
17650: 023A7C40320A41CD = 578
17658: 7E4DC3A402CD3C4E = 785
17666: FE5B281E3C0A4 2F = 504
17674: 2810CD6F41CD5R42 = 798
17682: 79FE04D4A743CD2R = 1072
17690: 44C9010100AF323C = 556
17698: 40C9FFFFFFFFFFFF = 1100
17706: 695554AD5552E555 = 868
17714: 7BDD57495555D675D = 878
17722: 7A8DFDFE3572EE0 = 1263
17730: 1C80FE3C0A94A1F = 890
17738: F56F001564FFF5 = 1104
17746: 2078006F3FFFFE60 = 995
17754: 000E020B09131302 = 76
17762: 0B1E4FFFFC0000010 = 809
17770: 7FFFC10000FFFFF0 = 1197
17778: 000007FFEFC04021 = 798
17786: FDFFBC5000SFFFFE = 1476
17794: 0FFFFCFFFD1100 = 825
17802: 0FFFFFS000027FF = 1037
17810: E9000027FFFF8000 = 910
17818: 0003031130150E = 88
17826: 0000000SD1D705 = 676
17834: 5450575141494505 = 544
17842: 0517D4144157530 5 = 544
17850: 556C1554E7D55110 = 839
17858: 0000000116007DFA80 = 1058
17866: 140AFFD4A005AF = 940
17874: FDFA50152BFFD46 = 1394
17882: 000B021007 0B1305 = 71
17890: 0314FFFFFC08021F = 035
17898: FFFF50020SFFFD6 = 1431
17906: 801D5AFFFF56A00SS = 938
17914: ABFD56A105SABFD5 = 1010
17922: 6AF055AA0156AFFD = 1116
17930: 5A00056BFFF5A010 = 1006
17938: 16FFFFDA0100107FFF = 1133
17946: FF0B090103011013 = 320
17954: 0814141414141C33C = 363
17962: 0760001220 5EA76 = 632
17970: 76C3E2E2E2E2E2E2 = 710
17978: F847CD2948160053 = 910
17986: 382834372R0E1C1C = 315
17994: 1C1C1C1C00000000 = 112
18002: 3220C0C0C0FFFF2100 = 476
18010: 0022F748CDF94BF0 = 1132
18018: 3621003E63320941 = 372
18026: CD8440CD57403E7F = 994
18034: DDE5FD2A7473EBF = 1069
18042: DBFECB8FCCD54E3A = 1273
18050: 0A402B7C5520FB79 = 865
18058: R7283FE01280218 = 577
18066: D3A8D80033C17 = 630
18074: 2D2E39002E3E0020 = 287
18082: 003833341762A2R = 1000
18090: 17FFCDE946C36A46 = 1157
18098: FD56C000CDE147FD = 1121
18106: 363CFFC0FRAC1A7F = 092
18114: 2036CD294808033C = 285
18122: 17343R390342B00 = 1138
18130: 0D2E3E2A1B1B17FF = 527
18138: CDE5A0CD2A481706 = 855
18146: 33252SFFC36546E2A = 1066
18154: 0C4001EB02097EFE = 703
18162: 1D382A35CDE748C9 = 869
18170: CD4D0E0E0E0E1717 = 417
18178: 3828372RA2330008 = 328
18186: 343235312A392A29 = 386
18194: 17FFF2AF7482322 = 731
18202: F74E2E2E2E2E1FD35 = 1218
18210: 3C002A0C4001CD02 = 402
18218: 0911SD4E5D50606 = 645
18226: 1ABE381E2004213 = 392
18234: 1SED1E1D1D294808 = 1022
18242: 032B17172C2E5322R = 265
18250: 00343B2A371717FF = 509
18258: 185ED1E1D10600ED = 796
18266: 0C4E9A40R03ZB17 = 573
18274: 2600332A0R03ZB17 = 552
18282: 0038283437ZA17FF = 595
18290: CD294B0D02333E34 = 498
18298: 3A370033283222A0E = 306
18306: 001B1B1B1B1B1B00 = 162
18314: FF2A0C4001C00109 = 765
18322: D9CDE147D9FE7628 = 1347
18330: 0AFE4030F3CDD247 = 1105
18338: 7718ED5B2E282B2B = 595
18346: 116749010600EDB0 = 613
18354: CD294810033C2633 = 487
18362: 3439ZD2A37002C26 = 463
18370: 322A000FFFCDE147 = 863
18378: 2133CA704AC33946 = 1015
18386: E52B2B2B2B45D1B = 505
18394: 010600EDB0E1C93A = 904
18402: 25403C20FFED4B25 = 792
18410: 40793C28F8CDBD07 = 934
18418: 7EC93E171100AFF2A = 654
18426: 0C400E1306020377 = 306
18434: 2310FC0D20F6C917 = 518
18442: 1717171717171717 = 184
18450: 1717171717170000 = 115
18458: 0000000000000000 = 0
18466: 0000000000212D9 = 284
18474: FD362200E146234E = 749
18482: 237E23FE5CDFF508 = 1128
18490: C12A0E4011094877 = 837
18498: 120A03CB772005 7 = 592
18506: 132319F3FIC5EB11 = 1011
18514: 09484F2E2444DFE = 966
18522: 2B2823FE32444 = 746
18530: 3D2816CD5C482100 = 573
18538: 002B7C8520FBEDSB = 959
18546: 01C0210948EDB018 = 629
18554: 03CD8C0D2E0E0E = 866
18562: CD9948CD8C4810F8 = 1111
18570: D9C92A0E40597EC6 = 951
18578: 8077231D20FBC921 = 825
18586: 401F2E1E5E2E2E2E = 927
18594: 1936831DFBC92A0C = 537
18602: 401101000618CDA2 = 479
18610: 4811210006 15CDA2 = 516
18618: 4811DFFF0615CDA2 = 995
18626: 4811DFFF0615CDA2 = 961
18634: 48C9237EFE88C0C5 = 1213
18642: 0106000SC1C9A0C = 469
18650: 0000EDB0C1C02B = 930
18658: 36002318F73EEDCD = 763
18666: D5483E8BCDD5483E = 1044
18674: 03CDD848C900003E = 754
18682: 0E1D48F7481806AF = 1091
18690: EDAB8F0C0C2140 = 585
18698: C5CDA848C179EE3C = 889
18706: 470E00CB38CB19CB = 775
18714: 38CB19E12445095B = 666
18722: 2A0C4000C2000906 = 159
18730: 373A2140A71AF0C = 952
18738: RD49FIC498491310 = 984
18746: F0424BEB3R2140A7 = 938
18754: C8D6D4A0394910FB = 892
18762: CD29481703E3E = 449
18770: 2E322A0E25250000 = 1224
18778: 2D2E0E1C1C1C1C1C = 245
18786: 1C1C1C1C3E0E1B1B = 224
18794: 1B1B1BFFCD2A0E0B = 662
18802: 1833382D2A2A390E = 331
18810: FF011A00ACDF50A0 = 987
18818: 4BF748CD9S8ARC9C5 = 1159
18826: 462342E23E5CDFF08 = 905
18834: E13EB4D7C1C9D5E5 = 1284
18842: 16083E00CB133802 = 372
18850: 1B347 7CDCC481520 = 767
18858: F1D1C9DB11000078 = 1015
18866: FE10CB13CDCC4C9 = 994
18874: 20F57BD112C93434 = 932
18882: 3417171717343434 = 300
18890: 3434341717343434 = 271
18898: 1717173434341717 = 300
18906: 1734173417341717 = 300
18914: 1734173417171734 = 271
18922: 3434341734341717 = 300
18930: 1734171717343434 = 300
18938: 3434171717171717 = 300
18946: 3434341734171717 = 300
18954: 3417173434341717 = 300
18962: 1717171734341717 = 300
18970: 3417341717173434 = 813
18978: 3434000004000000 = 108
18986: 7600B1B404000076 = 501
18994: 00808107030000 00 = 389
19002: 0280830600760008 = 204
19010: 8005008176858007 = 648
19018: 0181807685800400 = 643
19026: 8501 8580000005 = 525
19034: 0076850584000005 = 525
19042: 7680000000050076 = 370
19050: 0282840600000CDF4 = 719
19058: 470284840200D3D3C = 518
19066: 2A3128343428A0C = 402
19074: 341B1B1BFF01000C = 432
19082: CDF50306401124A = 667
19090: FAD7A1CDFBCDE24A = 1032
19098: CD294810003D1B1B = 464
19106: 11001D2524410027 = 464
19114: 3EFFCD294811083D = 721
19122: 2A0C4000C2A31003B = 358
19130: 263300343A2A3437 = 354
19138: 2A3327A372CFFCD = 749
19146: 2948170A3D3537 2A = 577
19154: 3B2B0E3333E0030 = 311
19162: 2A3EFFCDF2E3E2A = 1139
19170: 11C0490514C5CD31 = 759
19178: 4BCD124BC13A2540 = 725
19186: CD2A1210F0061FC5 = 600
19194: CD124BC13A2540CD3 = 715
19202: 200310F3C9E133C7 = 909
19210: DBFE1FD9A9346CFOC = 1058
19218: DCD294482R0C4001 = 752
19226: 480109545D3E0528 = 969
19234: 011E00EDB82B1B1B = 549
19242: 1B2B3D20F2D1C92A = 857
19250: 0C4001A7000900505 = 264
19258: C5A1A3FE3A2000235E = 644
19266: B4CBB777012100 9 = 728
19274: C110EDC9C3 = 842
```

Opus. DISCOVERY 1

The Dawn of a new beginning for your Spectrum

Introducing Discovery 1 – quite simply the most advanced and comprehensive disc drive unit yet developed for the Spectrum and Spectrum + computers.

Discovery is the breakthrough in design, performance and price which promises to make other Spectrum solutions obsolete. Just look at its advanced features:

- **The very latest 3½ inch disc drive unit**
- **Peripheral through connector**
- **Parallel printer port**
- **Joystick interface**
- **Video monitor port**
- **On-board power supply**

But the biggest discovery of all is the price – just £199.95

Upgrading to a dual-drive system is simple with the 'Discovery +' upgrade package – £139.95, or choose a purpose-built twin-drive unit, 'Discovery 2' – £329.95.

THE DISCOVERY RANGE

- Available through the Opus dealer network nationwide – ring for your nearest stockist – or direct from Opus Supplies. For further details ring us on: 0737 65080 or post the coupon.

Please rush me the following (ALL PRICES INCLUDE VAT & CARRIAGE)
– Discovery 1 unit(s) at £199.95 each
– Discovery 2 unit(s) at £329.95 each

YC Ad1

I enclose a cheque for £ _____ or please debit my credit card account with the amout of £ _____

My Access☐ Barclaycard☐ (please tick) no. is _____

Name _____

Address _____

Telephone _____

Opus. Opus Supplies Ltd.

55 Ormside Way, Holmethorpe Industrial Estate, Redhill, Surrey.
TELEPHONE: 0737-65080

COMMODORE 64, BBC AND SPECTRUM

Figure 1. CBM-64.

```
5 REM   HEX LOADER FOR CBM 64   FIG.1
6 REM
10 FOR I=680 TO 727:READA:POKEI,A:T=T+A
20 NEXT:IF T=6716 THEN GOTO 100
30 PRINT"ERROR IN DATA ";T-6715:END
40 DATA 169,1,133,186,169,1,133,184
50 DATA 133,185,169,8,133,183,169,208
60 DATA 133,187,169,2,133,188,169,56
70 DATA 133,251,169,199,133,252,169,251
80 DATA 162,231,160,206,32,216,255,96
90 DATA 58,79,87,78,76,79,68,68
100 $A=51000 LA=52855
110 INPUT"START ADDRESS";A
120 IF (A<$A) OR (A>LA) THEN GOTO 140
130 IF A/8=INT(A/8) THEN GOTO 150
140 PRINT:PRINT"ADDRESS ERROR":GOTO 110
150 T=(A-32768)AND255:PRINTA:INPUTD#
160 IF D#="END" THEN GOTO 900
170 IF LEN(D#)=20 THEN GOTO 190
180 PRINT"WRONG LENGTH" GOTO 150
190 FOR B=0 TO 7:B$=MID$(D#,2*B+1,2)
200 GOSUB 300:IF E=1 THEN GOTO 280
210 POKE A+B,D:T=T+D:NEXT
220 B$=MID$(D#,18,3):GOSUB 300
230 IF E=1 THEN GOTO 280
240 IF T=D THEN GOTO 260
250 PRINT"CHECKSUM ERROR":GOTO 150
260 A = A+8:IF A<LA THEN GOTO 150
270 GOTO 800
280 PRINT"BAD:"B$+B$+B$+D)CR$"??"
290 B=8:NEXT:GOTO 150
300 E=0:D=0:FOR N=1 TO LEN(B$)
310 C$=MID$(B$,N,1):GOSUB 400
320 IF E=1 THEN D=N:N=4:NEXT:RETURN
330 D=D16+X:NEXT:RETURN
400 X=ASC(C$)-48:IF X<0 THEN E=1:RETURN
410 IF X<10 THEN RETURN
420 X=X-7:IF X<10 THEN E=1 RETURN
430 IF X>15 THEN E=1
440 RETURN
500 H$="0123456789ABCDEF"
510 FOR A=$A TO LA STEP 8
520 PRINT A;":";:T=(A-32768)AND255
530 FOR B=0 TO 7:X=PEEK(A+B):GOSUB 600
540 T=T+X:NEXT:PRINT":";
550 V=INT(T/256):PRINT MID$(H$,V+1,1);
570 X=255 AND T:GOSUB 600:PRINT
580 NEXT:GOTO 900
600 PRINT MID$(H$,INT(X/16)+1,1);
610 PRINT MID$(H$,1+(XAND15),1); RETURN
800 SYS 680:C$=CHR$(34)
810 PRINT PRINT" TO RELOAD CODE ."
815 PRINT PRINT"  LOAD"C$"DOWNLOAD";
820 PRINTC$",1,1  (RETURN)"
825 PRINT PRINT"  THEN TYPE  NEW";
830 PRINT"  (RETURN)"
835 PRINT PRINT"TO RUN THE PROGRAM";
840 PRINT"  SYS 51000  (RETURN)"
900 PRINT PRINT"1  ENTER DATA"
910 PRINT PRINT"2  PRINT DATA"
920 PRINT PRINT"3  SAVE DATA"
930 INPUT Z:ON Z GOTO 100,500,800
```

THE PROGRAMS given here will enable Spectrum, BBC, and CBM-64 owners to download via *Your Computer's* Telsoft service. Each month for each machine we transmit at least one — and usually two — of the main programs appearing in the current issue. Also available is the full user to user communications program, Dialsoft.

So far OE LTD's Telemod 2 and the VTX 5000 modems have been tested with the BBC and Spectrum but the service also works with

Figure 2. CBM-64.

```
51000 ? A9068D21D08D20D0-=352
51008 ? A98F8D8D02A98E20-=2E4
51016 ? D2FF8D8A02A98E920-=E8
51024 ? FF8D8A02C8A98E920-=4DD
51032 ? 20CAC920C7D20F-=4D5
51040 ? CAAD80CEC931F023-=532
51048 ? C935F014C936D006-=43F
51056 ? 20D2FF20CFD0D8-=52E
51064 ? 4C93C94C4AC820C3-=411
51072 ? CC20D22CD0F0C8-=547
51080 ? A9CE85FE2028CDA0-=4E1
51088 ? 002095C2202FCBC9-=404
51096 ? 44F00BC954D0E2-=4E1
51104 ? D2FFA901D007A944-=4EF
51112 ? 20FDA90885BA20-=4B9
51120 ? 20CD9022A8BCCA9-=4B3
51128 ? BD85FD85CD85FE-=6A0
51136 ? 95CC9848A0049CD3-=4C
51144 ? C0D0C968A82025-=4C4
51152 ? 20D2FF20D8C9AD7-=5E3
51160 ? 68A9200C8A85FC-=6EA
51168 ? 8885999A293A0E-=39A
51176 ? C0D295C9948A906-=4C5
51184 ? 8D83CE20D8C9AD7-=5E3
51192 ? CE85FBADA8CE85FC-=6EA
51200 ? 68A9200C8A85FC-=6EA
51208 ? 8885999A293A0E-=39A
51216 ? 20BDFFAE3CECAA-=567
51224 ? CEEBD01C0205CD-=479
51232 ? A9FB20BDFFA01C8-=597
51240 ? 002D9CCC90D0D8-=3FE
51248 ? A900857A9220D2-=3E0
51256 ? 0D2025C9960D20-=306
51264 ? FF9993CEC8D0F820-=43F
51272 ? D2C8990FB20CD8-=5FB
51280 ? F8B07CE20A0008C7-=4D4
51288 ? CE8C7CA20CCCA0-=4D4
51296 ? 72CE29F00D0E4-=5C6
51304 ? 20D2CB0DA9973CE-=599
51312 ? C8202ECC009D0F0-=4EB
51320 ? A900AD76CE2980D0-=492
51328 ? 0FA5B85FB18A52C-=3D8
51336 ? 6D75CE85FA4CAAC0-=587
51344 ? AD78CE85FBAD79CE-=607
51352 ? 85FC20D2FFC9CE-=697
51360 ? D9CC20D2FFC820D9-=697
51368 ? CC20D2CC20D1DEA-=528
51376 ? 20CED20FCD8D9-=4D7
51384 ? D2FF2030C84C5728-=5C
51392 ? A920A0D2FFA0D0EA-=528
51400 ? 20CED20FCD8D9-=4D7
51408 ? CD7CCEF00B9D920-=503
51416 ? D2FF2030C84C5728-=5C
51424 ? 20D2CB80F8CD7DCE-=652
51432 ? D0EBAD75CEA8B993-=687
51440 ? CED00E2030C8A991-=4EE
51448 ? 20D2FF4C7EC94C57-=51F
51456 ? C8A0008C7CCE8C7D-=447
51464 ? CE20D2CB80F91FB-=5BF
51472 ? 202ECCC8CC77CE0-=4D3
51480 ? 20D2CB0E0CD7C-=59E
51488 ? CEF80A99D20D2FF-=4D8
51496 ? 4C57C8D20D2CB80-=4E
51504 ? CD7DCEF00A34C23C9-=473
51512 ? 20ACCB2030C0AD75-=409
51520 ? CEA8A99999CD-=506
51528 ? 84CEC90D0D2520BD-=36
51536 ? CB9CB20F3CB9555-=568
51544 ? 20EC0A99020F3CB-=432
51552 ? 20C7CB8C73CE8C88-=54F
51560 ? B993CED0C988-=54F
51568 ? 4C5BC7A99520F3CB-=432
51576 ? 20EC0A99020F3CB-=432
51584 ? 4C1CB4C63C9AC7D-=3DF
51592 ? CE20D2CB80D0FA20-=57D
51600 ? D2CB20D2CB4C47C9-=53E
51608 ? 4C9CC8A52B85FA85-=4F5
51616 ? 2C85FCA0008FB99-=52A
51624 ? 2200C8B1FB852F0-=4CE
51632 ? 0BA52285FBA52385-=447
51640 ? FC4C9BC91A85FB69-=57D
51648 ? 02852D852F8531A5-=37B
51656 ? FC69B852E85308E5-=412
51664 ? 8AC6A90B8D0D2CE9-=4A
51672 ? 8E91C8C82CEA200-=533
51680 ? A0D98DCDE282FCD-=4D4
51688 ? C914F01C90F0F51-=4E2
51696 ? C924D19A9D2FFBD-=544
51704 ? D0E3E000F5C9C93090-=554
51712 ? D4C93A9D0F0C9C93090-=554
51720 ? CEC924F0048DC3-=444
51728 ? C968F94190F0C3E5-=460
51736 ? B0B820F2F347-=4B4
51744 ? C90A9002E907E005-=5C9
51752 ? F0A8C9CE85A4CE5-=61A
51760 ? C9E00F00E001D0-=52A
51768 ? 07ADC3CEC9D0D1D0-=52A
51776 ? A9202D2FFA9FC9-=54F
51784 ? C3CE200EFCE9E-=54
51792 ? D0CE8E1CE9E0D2E-=559
51800 ? ADC3CE2324D00A9-=512
51808 ? 0F8DCDCEE8BDC3CE-=5D0
51816 ? C9FFF01D20CE9E0D2E-=559
51824 ? 0F8DCDCEE8BDC3CE-=5D0
51832 ? 8DCFCE8A900D8DCE-=56
51840 ? 8DDCE8D20E94C75-=534
51848 ? 34198DC3CE6DCFCE-=524
51856 ? 8DDCE8D20E8D6C-=56
51864 ? CA8DCFCE8A9C75-=534
51872 ? A3CE68AD0CE9E-=642
51880 ? CEC818C83CE8C82-=561
51888 ? CEAE810E60205CD-=4ED
51896 ? A200B41CEC921F0-=500
51904 ? 07200ZFFE94CBACA-=570
51912 ? 4CDEC9ADCDCE8DCE-=5E
51920 ? CE8DCFCE8DD1CEAD-=6C1
51928 ? D0CE8DD2CE18ADD1-=639
51936 ? CE6DCFCE8DCFCEAD-=6BF
51944 ? D2CE6DD0CE8DCFCEAD-=6BF
51952 ? D00CEEC8CEDAE560-=625
51960 ? 2063C4A9AF8D60-=414
51968 ? A95185FDA9CD85FE-=575
51976 ? A000209DCC20235C-=343
51984 ? 209DCC209DCC209D-=3DF
51992 ? CC20D2CD20A9CC20-=3AE
52000 ? 95CC20D2CD209CC-=411
52008 ? 202FCB20D2FF608E-=421
52016 ? 31CE8C82CE8C9C-=4B0
52024 ? 20ECCC20CACCC9D0-=48F
52032 ? D0D20FDCCC931F0-=4F0
52040 ? D6A901C04C35CB8D-=314
52048 ? 80CE8E81CEAC82CE-=597
52056 ? 60AE92CE9A4C5BC7-=4CE
52064 ? 20CD22A9225FDA9-=465
52072 ? CE85FEA000209CC-=4DA
52080 ? 2B2CDA00FA92099-=393
52088 ? 93CE8D0AF8D93CE-=619
52096 ? 202FCB91A10A10C0-=417
52104 ? 00AF520D2FF8D9-=58F
52112 ? 209993CE4C80CBC9-=50A
52120 ? 0DF00B20D2FF9993-=4D3
52128 ? CEC8C010D0DAA920-=579
52136 ? 20D2FF60A9138D00-=452
52144 ? FA94F20D2FFA94B-=50C
52152 ? 20D2FF60A9138D00-=452
52160 ? 8A9128D00CE80A9-=4C0
52168 ? 538D00A9528D00-=40E
52176 ? 8C82CEAC82D200-=547
52184 ? CC20ECCCE97CED0-=677
52192 ? 0239820FDCCD0E-=447
52200 ? 60A9FAC82CEA820-=509
52208 ? 04CC80DFAAC82CE-=616
52216 ? 60204CC8AAC82CE-=616
52224 ? D0FDA20269CC6820-=45
52232 ? D5DA9020ADCCA20-=364
52240 ? 95CCA8BCE20D2FF-=573
52248 ? ABCC20D8C9604D7D-=4BA
52256 ? CE8D7DCE20A8D7D-=4BA
52264 ? CEA9010AD7DCE49-=411
52272 ? 00AD7DCEAD7CCE49-=460
52280 ? 100D7CCE2E7CCE2E-=5D5
52288 ? A9003900DA0C8C018-=40E
52296 ? D0F60A9320D2FF-=5B3
52304 ? 504A85A220F0D1F-=37E
52312 ? A5D448A5A229108-=4A1
52320 ? 20D2FF9005D4A9-=51C
52328 ? 8D20D2FF85D468-=53F
52336 ? 21D0F5C860205CD-=4B9
52344 ? A90C20ABCC2095CC-=46D
52352 ? 60A9058E81CEAA9-=4E6
52360 ? 202D2FFCA0DFAAE-=603
52368 ? 7FF0016009140A9-=505
52376 ? 7F6020E4FFC9190-=5C4
52384 ? 07C9DB00338E960-=4AF
52392 ? 00C91900EC95890-=494
52400 ? 02492A0D0C97BB0-=49C
52408 ? 20E1FFD0034C53C-=533
52416 ? 286AA6860A0D0DE-=485
52424 ? 4901A9003A90D50-=250
52432 ? 4902A9A6A8D0DE-=3C7
52440 ? CD80FB6D1DE20EC-=508
52448 ? 8D8C20F6D0A20-=223
52456 ? CC6D2C5D20E8C-=373
52464 ? 20E1FFD0034C53C-=533
52472 ? 286AA6860A0D0DE-=485
52480 ? 4901A9003A90D50-=250
52488 ? 4902A9A6A8D0DE-=3C7
52496 ? CD80FB6D1DE20EC-=508
52504 ? 8D8C20F6D0A20-=223
52512 ? CC6D2C5D20E8C-=373
52520 ? 8D8C20F6D0A20-=223
52528 ? F66D8A6A9A20-=3A0
52536 ? 3A30013B6D72D2-=21F
52544 ? FF6B29F0B93C93-=31B
52552 ? 30013B6D72D2FF-=2F4
52560 ? 50444F574E4C4F41-=2C4
52568 ? 44204D454E552131-=243
52576 ? 2020D52454342549-=228
52584 ? 56452D52D20D2FF-=229
52592 ? 5849542D5D45-=1FE
52600 ? 415349432D4F2042-=2BA
52608 ? 2D5341564524D5-=22F
52616 ? 5D4553212D2D55-=28A
52624 ? 4520D2D2D2D5553-=285
52632 ? 209220544F4550-=2D6
52640 ? 545552D4D45245-=2C4
52648 ? 414544552D29214-=2CC
52656 ? 4E4D4552D2D4F5-=2BC
52664 ? 4245520D2E554D-=2C9
52672 ? 414444552D2D2D-=2C9
52680 ? 4953204942D4845-=2C8
52688 ? 5B2C11D9D9D9D9D-=476
52696 ? 9D9D9D9D9D9D9D9D-=5C1
52704 ? 9D9D9D9D9D9D9D9D-=5C1
52712 ? 49520574945446-=401
52720 ? 4D4F52204152541-=3E
52728 ? 2421535441524541-=2D3
52736 ? 414445245535320-=31E
52744 ? 4D4F52204152541-=220
52752 ? 2021D4D4D4C4C4C4-=2D8
52760 ? 4D4F52204152541-=220
52768 ? 2021D5D4F4C4-=238
52776 ? 4D20544945445-=2C
52784 ? 2B4D1F5D2D31362D-=1E5
52792 ? 4348415D2D31362D-=1E5
52800 ? 211D4E4F5420D5-=21B
52808 ? 4C4944422C2D4542-=2B5
52816 ? 5920414741494E2D-=249
52824 ? 3A2D2144495334320-=216
52832 ? 4F5220544150452D-=26B
52840 ? 2B2D4D2F54202D32-=1E0
52848 ? 3F210000000000000-=000
```

TELSOFT

A reminder of how to use the Telsoft service.

a number of other makes. For the CBM-64 it will initially only be available with the OEL Comms pack together with the Telemond 2 or similar modem; later we hope to adapt the service to work with Commodore's modem.

To enter the download program first type in the hexloader for your machine — figure 1 — and then enter the machine code — figure 2. Once the program has been saved you can run it by entering CALL &6000 on the BBC, SYS 51000 on the CBM 64, RANDOMIZE USR 60000 on the Spectrum.

To find out what is available and how to download use dial up Colchester (0206) 8068. This audio recorded information line will also advise you which telephone numbers to ring for the 300 and 1200 bit/s services.

When a program you want to download is on line, make sure your modem is set up and dial the number appropriate to its speed. As soon as you hear the modem tones switch the modem to line and replace the receiver. Select Option 1 from the menu — Receive. After a block of data is received you will see "OK" printed if there are no errors, otherwise the program will wait for the blocks to come round again. When the "Program loaded OK" message appears return to the Telsoft menu and select Option 5. You can now save and run the program.

Note that CBM-64 owners will need to use Option 6 if machine code is to be saved.

Figure 1. BBC.

```
10 REM BBC HEX CODE LOADER
15 HIMEM=&FF
20 CLS:PRINT
30 INPUT " START ADDRESS (Hex)";A$
40 A=EVAL("&"+A$)
50 IF P>&6FF THEN 200
60 IF A<&2A00 OR A>&6FE7 THEN 20
70 PRINT "A" ";
80 INPUT ";" B$,C$
90 IF LEN(B$) <>16 THEN 50
100 T=0
110 FOR N=0 TO 7
120 X$= MID$(B$,2*N+1,1): GOSUB 300
130 IF E<1 THEN 260
140 X$= MID$(B$,2*N+2,1): GOSUB 300
150 IF E<1 THEN 260
160 B= EVAL("&"+MID$(B$,2*N+1,2))
170 ?A=B:A=A+1:T=T+B
180 NEXT
190 FOR M = 1 TO LEN (C$)
200 X$=MID$(C$,M,1):GOSUB 300
210 IF E =1 THEN A=A-1: GOTO 260
220 NEXT
230 IF T= EVAL("&"+C$) THEN 50
240 PRINT "CHECKSUM ERROR !"
250 A=A-8:GOTO 50
260 PRINT "TYPING ERROR !"
270 A=A-(A DIV 8):GOTO 50
280 =SAVE "DOWNLOAD" &600 &FB7
290 END
300 E=8:IF ASC(X$)<48 THEN E=1:RETURN
310 IF ASC(X$)<58 THEN RETURN
320 IF ASC(X$)<65 THEN E=1:RETURN
330 IF ASC(X$)>71 THEN E=1
340 RETURN
```

Figure 2. BBC.

```
6A00 :A9C0A0FEA20120F4,4C6
6A08 :FF20616C2048E6C9,38A
6A10 :31F000C934F8E9C9,4C8
6A18 :35F0A4C0C6A4C7,280
6A20 :A9A9C2C7A9C7A4C7,280
6A28 :A000A2FF20FAFA9,AF0
6A30 :03A2000F4FFA9C0A0,4C8
6A38 :A200220F4FF8A9,4BC
6A40 :FEA20220F4FF8A9,4BC
6A48 :0C20E3FF20E7A8A9,439
6A50 :15A20120F4FFA000,3E9
6A58 :9FF009905EF00FA,507
6A60 :A915A20120F4FF20,394
6A68 :0CA9BF8200C6C00,348
6A70 :FB4A000477847B84,416
6A78 :79047A0478B7B028,38B
6A80 :D56DA7C29C980,489
6A88 :D0E2200CA5B0099,46B
6A90 :7100C020D5C5D0B9,364
6A98 :D0F0A000A57C2980,422
6AA0 :D00BA51C857610A5,254
6AA8 :1D457385772D2D5,524
6AB0 :D0C8109F8057320,435
6AC0 :B26D20C6C0D00C5,3CC
6AC8 :7AF00A95020CE5F,47B
6AD0 :20E7FFAC67A200C,34F
6AD8 :6C000CC57D F00BA9,48C
6AE0 :58200E3FF2DC7FFAC,44C
6AE8 :67A9A573A00F05F,43E
6AF0 :D00E2007FFA9020,338
6AF8 :E3FF4C85A8A2A9A9,489
6B00 :A000A70A7B2D0C,2C9
6B08 :A9A0FEA20120F4,4C6
6B10 :FF20616C2048E6C9,38A
6B18 :31F000C934F8E9C9,4C8
6B20 :35F0A4C0C6A4C7,280
6B28 :A9A9C2C7A9C7A4C7,280
6B30 :A000A2FF20FAFA9,AF0
6B38 :03A2000F4FFA9C0A0,4C8
6B40 :A200220F4FF8A9,4BC
6B48 :FEA20220F4FF8A9,4BC
6B50 :0C20E3FF20E7A8A9,439
6B58 :15A20120F4FFA000,3E9
6B60 :9FF009905EF00FA,507
6B68 :A915A20120F4FF20,394
6B70 :0CA9BF8200C6C00,348
6B78 :FB4A000477847B84,416
6B80 :79047A0478B7B028,38B
6B88 :D56DA7C29C980,489
6B90 :D0E2200CA5B0099,46B
6B98 :7100C020D5C5D0B9,364
6BA0 :D0F0A000A57C2980,422
6BA8 :D00BA51C857610A5,254
6BB0 :1D457385772D2D5,524
6BB8 :D0C8109F8057320,435
6BC0 :B26D20C6C0D00C5,3CC
6BC8 :7AF00A95020CE5F,47B
6BD0 :20E7FFAC67A200C,34F
6BD8 :6C000CC57D F00BA9,48C
6BE0 :58200E3FF2DC7FFAC,44C
6BE8 :67A9A573A00F05F,43E
6BF0 :D00E2007FFA9020,338
6BF8 :E3FF4C85A8A2A9A9,489
6C00 :A000A70A7B2D0C,2C9
6C08 :C0BF291762D05C9,4A6
6C10 :C0C475D8F120D6C,45A
6C18 :D0E3C57AF00BA950,4CE
6C20 :20E3FF20E7FF4C67,A00
6C28 :A200C6C00CFCC7F,3C1
6C30 :F00A95020CE5F,47B
6C38 :676A20C7A020E7FF,429
6C40 :A573A00D09905AF,3F6
6C48 :45BAC9D2D0207,419
6C50 :8A9C82055AC9955,39D
6C58 :2038A6A95020554C,298
6C60 :A915A20120F4FF20,394
6C68 :F76BA471CB0B9905,585
6C70 :F0D5119D0F7A9FC,444
6C78 :20E3FF20A56DA954,347
6C80 :B502A9F5D3A947,3D7
6C88 :2000A6C00F5D20D0,208
6C90 :0DA9B52000A6A9B8,2DA
6C98 :20E3FF20F0DA9D2,502
6CA0 :20E0FF4C8DAA9F5,38F
6CA8 :2038A6A95020554C,2DE
6CB0 :4C6A0A475200C6C,2D2
6CB8 :B8D0FA200C6C2D0C,316
6CC0 :C4CA0A9AC6CA0A9,336
6CC8 :2020E3FFA9F20E3,43D
6CD8 :FFA9A020E3FF60A9,51E
6CE0 :9C000A0A0A0A0E0,41E
6CE8 :80A2132BF4FFA212,38F
6CF0 :2BF4FF60A0292F2A,4C8
6CF8 :FFA29620FFFA0A9,3F5
6D00 :9C000A0A0A0E0200,41E
6D08 :E0A25320FFA9252,4E7
6D10 :2BF4FF60A0F9E45,44F
6D18 :BF9A7EC091A2B020,38D
6D20 :F4FF000C9C007D005,440
6D28 :A000A70A7B2D0C,2C9
6D30 :C0BF291762D05C9,4A6
6D38 :C0C475D8F120D6C,45A
6D40 :D0E3C57AF00BA950,4CE
6D48 :20E3FF20E7FF4C67,A00
6D50 :A200C6C00CFCC7F,3C1
6D58 :F00A95020CE5F,47B
6D60 :676A20C7A020E7FF,429
6D68 :A573A00D09905AF,3F6
6D70 :45BAC9D2D0207,419
6D78 :8A9C82055AC9955,39D
6D80 :2038A6A95020554C,298
6D88 :A915A20120F4FF20,394
6D90 :F76BA471CB0B9905,585
6D98 :F0D5119D0F7A9FC,444
6DA0 :20E3FF20A56DA954,347
6DA8 :B502A9F5D3A947,3D7
6DB0 :2000A6C00F5D20D0,208
6DB8 :0DA9B52000A6A9B8,2DA
6DC0 :20E3FF20F0DA9D2,502
6DC8 :20E0FF4C8DAA9F5,38F
6DD0 :2038A6A95020554C,2DE
6DD8 :4C6A0A475200C6C,2D2
6DE0 :B8D0FA200C6C2D0C,316
6DE8 :C4CA0A9AC6CA0A9,336
6DF0 :2020E3FFA9F20E3,43D
6DF8 :FFA9A020E3FF60A9,51E
6E00 :9C000A0A0A0A0E0,41E
6E08 :80A2132BF4FFA212,38F
6E10 :2BF4FF60A0292F2A,4C8
6E18 :FFA29620FFFA0A9,3F5
6E20 :9C000A0A0A0E0200,41E
6E28 :E0A25320FFA9252,4E7
6E30 :2BF4FF60A0F9E45,44F
6E38 :BF9A7EC091A2B020,38D
6E40 :F4FF000C9C007D005,440
6E48 :A9D220E0FF057C60,4D9
6E50 :A9BC20E3FF20A860,3EF
6E58 :A9720000A6A99A05,30A
6E60 :8D0A00A9A0A0A020,361
6E68 :F8A0D20A0D2099D,3C0
6E70 :D0A20A0D2099D20A,317
6E78 :D0A90A200A6E20F0,2C6
6E80 :D20A0A6DA9822000,278
6E88 :A6E20F0A20A0A6D20,348
6E90 :E7FFA9D220E0FF40,5A8
6E98 :A98FA2082DF4FF60,3D5
6EA0 :D0A9D200A6E20F0,287
6EB0 :D20A0A6DA9D20A6D,33A
6EC0 :20A0A6D20E7FF20E7,445
6ED0 :FF6A0829FB6A6A6A,3FE
6EE0 :A0A93C93A3B319,1F1
6EF0 :A0A93C93A3B319,1F1
6F00 :A9A0A6D20E7FF20E7,445
6F10 :FF6A0829FB6A6A6A,3FE
6F20 :A0A93C93A3B319,1F1
6F30 :A0A93C93A3B319,1F1
6F40 :A9A0A6D20E7FF20E7,445
6F50 :FF6A0829FB6A6A6A,3FE
6F60 :A0A93C93A3B319,1F1
6F70 :A0A93C93A3B319,1F1
6F80 :A9A0A6D20E7FF20E7,445
6F90 :FF6A0829FB6A6A6A,3FE
6FA0 :A0A93C93A3B319,1F1
6FB0 :A0A93C93A3B319,1F1
6FC0 :A9A0A6D20E7FF20E7,445
6FD0 :FF6A0829FB6A6A6A,3FE
6FE0 :A0A93C93A3B319,1F1
6FF0 :A0A93C93A3B319,1F1
```

Figure 1. Spectrum.

```
5 REM SPECTRUM 48k    fig 1
10 REM Hex Code Loader
15 CLEAR 59000
20 POKE 23658,0: CLS : PRINT
30 INPUT "Start Address ";a
50 IF a>65125 THEN GO TO 200
60 IF a<60000 THEN GO TO 20
70 PRINT a;
80 INPUT ";b$
85 IF b$="END" THEN GO TO 200
90 IF LEN b$<>20 THEN GO TO 260
100 LET t=a-256*INT (a/256)
110 FOR n=0 TO 7
120 LET x$=b$(2*n+1 TO 2*n+1)
125 GO SUB 300: LET y=e
130 IF e=1 THEN GO TO 260
140 LET x$=b$(2*n+2 TO 2*n+2)
145 GO SUB 300: LET y=y*16+x
150 IF e=1 THEN GO TO 260
170 POKE a,y: LET a=a+1
180 LET t=t+y: NEXT n: LET y=0
190 FOR n=1 TO 17*a
200 LET x$=b$(17*a TO 17*a)
205 GO SUB 300: LET y=y*16+x
210 IF e=1 THEN LET a=a-1: GO TO 260
220 NEXT a
230 IF y=t THEN GO TO 240
240 PRINT "Checksum Error"
250 LET a=a-8: GO TO 50
260 PRINT "Typing Error"
270 LET a=a-(a/8): GO TO 50
280 SAVE "download" &600,1136
290 POKE 23658,8: STOP
300 LET e=0: LET x=CODE x$-48-7*(x$>"9")
310 IF x<0 OR x>15 THEN LET e=1
320 RETURN
```

Figure 2. Spectrum.

```
60000 :CD15EDC387ECCD15,4C7
60008 :DCCD36ECCD66EDCD,31A
60016 :30EDCD47EEC3EDCD,5AF
60024 :18EDFE31CA99EAFE,094
60032 :35CA07EAC36AEACD,508
60040 :1ED3EAFACD84EDCD,5F0
60048 :15EDC9CD15EDC366,553
60056 :EACD66EDD1E5CE06,58C
60064 :003EFF1231BFCD1D,45B
60072 :5EE11CDE6B173E,3D2
60080 :2812131FCCD1FED,5BA
60088 :30FACD50CCD1FED,588
60096 :30F3026203EF3E002,3E9
60104 :CCEF326CEFEF3270F,544
60112 :3A65EFCDEBEC3A65,5A1
60120 :EFE6FBFE00F20E0E,627
60128 :0911E5EFE1CD1FEDDA,501
60136 :AAEA1312CDEBEC8D,552
60144 :F20A269EFE6D020,51A
60152 :8D214B5C3A0BEFBE,3AC
60160 :0847092268EFBE00,1DA
60168 :11CDECCD1FED389A,47F
60176 :1213BCCDEBEC79FE,45C
60184 :1B20F83A6BEFCDB1,447
60192 :ECCD1FEDDAAAEA21,574
60200 :6FEFBE2013E5811,326
60208 :E8EE1213E3AEA,681
60216 :D7ECCDAEEC3AAEA,681
60224 :CD1FEDDAAAEA21F1,518
60232 :EF8E2013E3A,524
60240 :6BEFB5EFSE000C67,3CC
60248 :3E000E2000CD07EC,40F
60256 :3E12320000CD07EC,48F
60264 :3E00326FEF32708F,3C7
60272 :ED5B4BEFBE00CD1F,40C
60280 :EDDBAAAEA2735FCD,634
60288 :EBC3A6BEFFE0020,50A
60296 :053A6AFE6B03A73,432
60304 :EF12138C3A6AEF89,3FC
60312 :20CCD1FEDDAAAEA,5DB
60320 :216EFBEEC2D8BED,520
60328 :1FEDDAAAEA2170EF,5A2
60336 :BEC22D8BE3F3E02,5B9
60344 :EE3E0A32E3EE3E00,490
60352 :32E4EE3A0B3CFE21,581
60360 :2003CD15EDC9CD15,3C7
60368 :CDEBEC3A6AEFCDB1,5A8
60376 :EF05CF3E000C673,422
60384 :0021E5EEDB4B6EF,561
60392 :007EFB00CD8DEA23,4FC
60400 :0D2B6C3EFACDD94ED,5B9
60408 :3E01DSFEC36EACD,5E8
60416 :1FED3BFBCD3BDEAF3,594
60424 :B0630FD3FF1BFB5E,3DB
60432 :40D3FF3EFD3FF5E,56F
60440 :31D3FF3E0F320F5C,305
60448 :3D0C52405C3E01,250
60456 :D3FE21915CB9EFB,568
60464 :CD58DC3A6EACD15,52F
60472 :CD3E3A,524
60480 :21655EE3E08CD0FEC,442
60488 :CD04ECCD3A5ECDA6,654
60496 :EC23CD7FECCD7FEC,58F
60504 :C0B4ECCDB4ECCDA6,661
60512 :EC233E00CD0FECCD,4CF
60520 :D4EC23CD5A5EC3E83,49B
60528 :CD0FECCD04ECC9CD,408
60536 :A3EC3E07CD0FECCD,561
60544 :B4EC23C97FEE8C8,528
60552 :CD0FECD23C3E04ECFE,651
60560 :00C8F53E20CD8BED,520
60568 :F13DC3BFECCDAAEC,540
60576 :CDA3ECCDA6EC3E00,546
60584 :CD8BED3EF32BC5C,574
60592 :C9F51:3EAFBCB1FCB,608
60600 :1FCB1FCB1FF63BFE,4CF
60608 :3AFACCECCCB0712,490
60616 :1FE6BFF63BFE3AFA,486
60624 :D4ECC6B71213C92,41F
60632 :CDEE5CDD4ECE104,6FC
60640 :173E2077231BFC3E,339
60648 :0077C9E5217B0EF,538
60656 :77C5B6B07EA7CB17,44A
60664 :3B0D7EEE0B773A6F,3C9
60672 :EFEE10326FEF3721,3D5
60680 :1EFCD1E62CB1640,358
60688 :20E2C1EC191B581,394
60696 :216B0CDB503C93E,532
60704 :9632F7EDCD47EDDA,529
60712 :D3E3CD36EACDAC,5C0
60720 :ED7BE0B1F602D3FE,568
60728 :AF2177EF3520237,2F5
60736 :CD7D3EB0C9CD,8F0
60744 :47EEDBFECBC837C9,5E6
60752 :F5DBFF3A81EFFE00,5C7
60760 :2B45E3E1B023E37,18F
60768 :D3FFDB7FF1C9F53A,675
60776 :81EFFE00204B3E3E,376
60784 :D3FFCD5B0DF1C93E,644
60792 :000FFE60037CB0B,59.
60800 :FFE60237CB0FFA,3E0
60808 :3D2004DB7FF2004B3E37,397
60816 :D1BFE8D2004B3E37,397
60824 :D3FE0B7FC1C9F53A,675
60832 :C9CD47EDDA7E3FDB,5DE
60840 :FIC3A6EAFF53ED23D,62A
60848 :2DFE1C9CD5DE5F5F,780
60856 :2FA6C9CD5DE5F5F,780
60864 :7F2B7C2E9EDFEC,537
60872 :2B0CFEB2D003E20,34F
60880 :D73E8DD7181E20,34F
60888 :D73E8DD7A8D5CF6,4E0
60896 :21200E3E8D73E5F,2E6
60904 :D73E8DD7F1E1D1C1,640
60912 :C9FE0728FCEBCD28,4F3
60920 :11FFEC2B14FEB020,308
60928 :10FE0D20CFE20FA,367
60936 :BFEEFE08FA11EE3E,4B0
60944 :00C93E07D3FE3E,320
60952 :0D3E1E3E1832,1C4
60960 :895CC93E121681CD,382
60968 :1122C93E121680CD,257
60976 :113E0D3E5E3E02,3E9
60984 :CD811ECD47EE3BFB,451
60992 :CD5CEDCD5EDCD,5C9
61000 :1CSF5213B5CCBAEF1,4C3
61008 :AC9037C9F511800,3DE
61016 :CD10EDF1C9444AF57,4D6
61024 :CD4AF41444964F,204
61032 :4D4AE5D5D5003120,216
61040 :2020524543435926,276
61048 :4500352020204570,217
61056 :6974207446F204261,328
61064 :7369630020205573,2DF
61072 :6520577A6D6F6C,393
61080 :6520536B6967642020,300
61088 :2047207446F2052625,2C9
61096 :2E2E2E2E2074GF20,39C
61104 :7475732E5020290E,278
61112 :4D45E5D5202908,278
61120 :4E5445522D4E554D,389
61128 :4245522000000000,1C1
```

3 storey computer homes for under £60

3rd storey
– Impressive view and just the place for your monitor and printer

2nd storey
– Lots of floorspace for your computer and disc drive or cassette recorder. Ample storage space for your software.

1st storey
– Parking space for your books, manuals and magazines.

And at only £59.95 you won't even need to take out a mortgage.

Looking for a new home for your computer? Tired of being pushed from room to room with your family of peripherals? Better take a look at the Organiser showhome from Opus Supplies. It's fully mobile and combines practical features with modern design.

The Organiser desk from Opus Supplies comes complete with castors and simple assembly instructions and our price includes VAT and free delivery.

To order your system phone us on: 0737 65080 or post the coupon to Opus Supplies Limited.

To: Opus Supplies Ltd,
55 Ormside Way, Holmethorpe Industrial Estate, Redhill, Surrey.

Please rush me the following:
(PRICES INCLUDE VAT AND CARRIAGE)

_____ Organiser Desk(s) at £59.95 each (inc. VAT)

I enclose a cheque for £_____ or please debit my credit card account with the amount of £_____

My Access ☐ Barclaycard ☐ (please tick) no. is: _____

Name _____

Address _____

Telephone _____

Opus.
Opus Supplies Ltd.
55 Ormside Way,
Holmethorpe Industrial
Estate, Redhill, Surrey.
TELEPHONE: 0737-65080

RSD Connections Ltd

MONITOR LEADS

BBC to Microvitec	£2.20
TV to Computer	£1.25
Green to Screen	£2.95
BBC to Fidelity etc	£4.95
QL to Fidelity etc	£4.95
Commodore to Fidelity etc	£4.95
Phono to Phono	£1.25
BBC to Ferguson	£2.50
QL to Microvitec	£2.50
QL to mono monitor	£1.50
BBC to Sony/Kaga	£5.95
BNC to BNC	£2.95
Commodore to Ferguson	£2.50
BBC to Hitachi	£2.50
Sony to Fidelity etc	£6.50
MSX to Ferguson	£2.50
QL to Ferguson	£2.50

IDC AMPHENOL

36 way plug	£4.95
36 way socket	£5.95
36 way plug (solder type)	£4.95

DISK DRIVE LEADS

Dual disk drive power lead	£4.50
Dual disk drive lead 1m	£10.25
Single disk drive power lead	£2.75
Single disk drive lead 1m	£7.25
Disk drive extn lead 1m	£7.25

CASSETTE LEADS

BBC to cassette	£2.25
Dragon to cassette	£2.20
Spectrum to cassette	£1.25
BBC to Acorn cassette	£2.25

PRINTER LEADS

ALL 1 METRE LENGTH

BBC	£9.95
BBC serial	£8.95
AMSTRAD	£16.75
MEMOTECH	£12.75
EINSTEIN	£12.75
IBM PC	£15.75
SPECTRUM interface to RS 232	£9.75
ATARI	£15.25
ATARI	£133.95
APRICOT	£15.20
DRAGON	£9.95
QL	£10.75

ANY COMBINATION OF LEADS MADE TO ORDER

RIBBON CABLE (price per ft)

	Grey	Rainbow
9 way	£0.13	£0.24
10 way	£0.15	£0.28
14 way	£0.18	£0.32
15 way	£0.20	£0.36
16 way	£0.22	£0.40
20 way	£0.30	£0.50
24 way	£0.36	£0.60
25 way	£0.40	£0.65
26 way	£0.45	£0.70
34 way	£0.60	£0.80
37 way	£0.65	£0.85
50 way	£0.70	£0.90
50 way	£0.95	£1.25
60 way	£1.10	£1.40
64 way	£1.25	£1.50

EDGE CONNECTORS

2 × 23-way (ZX81)	£1.85
2 × 28-way (Spectrum)	£2.10
DOUBLE SIDED PLUG BOARD	
ZX-81 23-way	£1.25
Spectrum 28 way	£1.50
ADDITIONAL IDC	
56 way Card Edge for Extension Lead	£4.25

D CONNECTORS

	Solder Bucket	Male	Female
9-way		£0.75	£1.00
15-way		£0.95	£1.50
25-way		£1.50	£1.90
37-way		£2.40	£3.25
HOODS	£0.95		

TELEPHONE CONNS

Surface master jack socket	£3.75
Surface extn socket	£2.50
Dual outlet adaptor	£4.25
Line jack cord 3mtr	£1.85
4 core cable per metre	£0.48

All surface units shuttered BT approved.

CONNECTORS IDC

	Card Edge	Trans PCB	2 Row Socket
10-way	£1.20	£0.95	£0.80
14-way	–	–	£0.90
16-way	£1.60	£1.20	£1.00
20-way	£1.90	£1.35	£1.20
26 way	£2.40	£1.60	£1.45
34 way	£3.10	£1.95	£1.60
40-way	£3.40	£2.00	£1.85
50 way	£3.85	£2.25	£2.00
60-way	£4.80	£2.60	£2.25

SPECTRUM EX. LEADS

6 inch extensions calbe M to F	£10.50
6 inch F to 2M's	£14.75
12 inch extension cable M to F	£10.75

IDC SHROUDED HEADERS WITH EJECTING LOCKING ARMS

	Straight	Right angle
10-way	£0.85	£0.90
14-way	£1.00	£1.20
16-way	£1.25	£1.45
20-way	£1.40	£1.60
26-way	£1.70	£1.95
34-way	£2.00	£2.30
40-way	£2.15	£2.45
50 way	£2.30	£2.65
60 way	£2.45	£2.85

BBC MONITOR STAND

Heavy-duty stand
Vinyl covered in BBC colours to match
ONLY £11.95

DISTRIBUTION SOCKET

4 WAY MAINS

4-way top quality mains trailing sockets. Supplied wired up with mains plug ready for use. Can be screwed to floor or wall if required. Very useful for tidying up all the mains leads from your peripherals. Allows the whole system to be switched on from one plug. ONLY £9.50

SPECTRUM DRIVES

RS232 WAFA lead 1m	£10.50
Centronics WAFA lead 1m	£10.50
Micro Extn. lead 12"	£6.00

IDC D CONNECTORS

	Male	Female
9-way	£2.70	£3.20
15-way	£3.20	£3.70
25-way	£3.80	£4.45
37-way	£5.90	£6.80

TRADE ENQUIRIES WELCOME

75p P&P IN U.K. Access & Visa accepted. Add 15% VAT to all orders

Cheques made payable to

RSD Connections Ltd, Dept YC6
PO Box 1, Ware, Herts.
Tel: 0920 5285

VISA

CALDEW BUSINESS COMPUTER SYSTEMS

BBC Model B	335.00
BBC Model BD	380.00
Acorn Electron	120.00
Electron Starter Pack	143.00
Electron +1 Interface	56.00
Electron +3 Interface	214.00
Acorn Data Recorder	28.95
6502 2nd Processor	191.99
Speech Interface Kit	49.99
Z80 2nd Processor	349.00
Torch Z80 Disk Pack	719.00
Prestel Adaptor	120.00
CSX100 Disk Drive	105.00
CSX200 Disc Drive	139.99
CSX400 Disk Drive	164.00
12" Novex M/tors amber/green	99.99
12" Philips Green monitors	82.99
14" Grundig TV/monitor	249.99
Epson FX80 Printer	428.00
Epson RX80 FT Printer	272.00
Epson FX100 Printer	543.00
Juki 6100 Daisy Wheel	419.00
Brother M-1009 Printer	189.99
ATPL Sidewise ROM Board	46.99
Raven 20K Expansion Board	63.99

**** All Prices include VAT ****

Add £1.50 (P&P) per item to all orders and forward with address. Send stamped addressed envelope for detailed hardware and software price lists, with genuine reductions on all items.

Deliveries – software: 48 hours
– hardware: 7 days

161 DENTON STREET
DENTON HOLME
CARLISLE

SPACE JUNK

At last, 80,000 characters after blast off, the good ship Space Junk reaches its final destination. Nalin Sharma explains.

HERE IS a reminder of the loading and game instructions for Space Junk.

Insert cassette, press Shift and Run/Stop and start your cassette recorder. Loading time is about two minutes. Put your joystick into Port 2.

Can you retrieve all 32 satellites by mastering control of your ship, which can move up, down, left and right and can also fire bullets?

However, beware of the four yellow junkies which patrol the skies. Unless you can work out how to destroy them you're in trouble! To help you there's a radar at the top of the screen which will pinpoint the junkies and any miscellaneous junk which appears from time to time and can be retrieved for bonus points.

After every two sheets you'll get an extra life and an attempt at the challenge stage. Here you have 99 units of time to turn the four junkies into stormer — if you succeed you'll get 8000 points! Below your score is shown the number of satellites left to collect, together with the number of lives left.

Pressing F7 will freeze the game and pressing the Space-Bar will restart it. Tape copies of the program are available for £3.25 from Nalin Sharma, 35 Kitchener Road, Walthamstow, London E17 4LJ.

```
7328: ++001010202020202 19+
7330: 0808040404040404 028
7338: 0404040404040404 020
7340: 0404040404040404 020
7348: 0404040202020202 016
7350: 0202020202020204 012
7358: 1808100404081004 054
7360: 0408100402020810 03c
7368: 0402020810202022 026
7370: 0208100202020208 02a
7378: 1002020202081008 038
7380: 0404040418040202 030
7388: 0202040202040202 014
7390: 0404040414100404 03c
7398: 0202020204020204 014
73a0: 0404020202060404 01c
73a8: 0202020204041804 02c
73b0: 0410080404040404 030
73b8: 0404040404040404 020
73c0: 0404040404040404 020
73c8: 0404040404040404 020
73d0: 0404040404040404 020
73d8: 0404040404040404 020
73e0: 0404040404040404 020
73e8: 0404040404040404 020
73f0: 0404040404040404 020
73f8: 0404040404040404 020
7400: 0404040402020202 018
7408: 0202020204020202 012
7410: 0208080808040202 02a
7418: 0202020202020402 012
7420: 0202020808080804 02a
7428: 0202020202020202 010
7430: 0402020202080404 01c
7438: 0804040402020202 01c
7440: 0202020204020202 012
7448: 0208080808040202 02a
7450: 0202020202020402 012
7458: 0202020808080804 02a
7460: 0202020202020202 010
7468: 0402020202080404 01c
7470: 0804040404080202 024
7478: 0202020208020202 016
7480: 0202020802020202 016
7488: 0202080404040802 022
7490: 0202020202080202 016
7498: 0202020208020202 016
74a0: 0202020804040408 022
74a8: 0202020202020802 016
74b0: 0202020202080202 016
74b8: 0202020208040404 01c
74c0: 0802020202020208 01c
74c8: 0202020202020802 016
74d0: 0202020202080404 01a
74d8: 0404040404040404 020
74e0: 0404040404040404 020
74e8: 0404040404040404 020
74f0: 0404040404040404 020
74f8: 4649494649464949 23f
7500: 0404040404040410 02c
7508: 1010101010101010 080
7510: 1010104080ad++00 29c
7518: ++00++00bd000000 2bb
7520: 0000000000004800 048
7528: 4900400049004800 122
7530: 4900480049004849 16b
7538: 4900484949004849 1b4
7540: 4900004949000040 126
7548: 0048000046484800 11e
7550: 4649464946494946 23c
7558: 4946494649464949 23f
7560: 4649464946494649 23c
7568: 4946494649464946 23c
7570: 4949464946494649 23f
7578: 4649494649464946 23c
7580: 4946494946494649 23f
7588: 4649464949464946 23c
7590: 4946494649494649 23f
7598: 4649494649464946 23c
75a0: 4649464949464946 23c
75a8: 4946464946494946 23c
75b0: 4946494646494649 23c
75b8: 4946494649464649 23c
75c0: 4649494649464946 23c
75c8: 4649464949464946 23c
75d0: 494646494d494d4d 24e
75d8: 494d494d494d4949 254
75e0: 4d494d4d494d494d 25c
75e8: 494d49494d494d4d 258
75f0: 494d494d494d4949 254
75f8: 4d494d4d494d494d 25c
7600: 494d49494d494d4d 258
7608: 494d494d494d4949 254
7610: 4d494d4d494d494d 25c
7618: 494d49494242424b 239
7620: 424b42424b42424b 22b
7628: 42424b42424b4242 222
7630: 4b42424b42424b42 22b
7638: 424b42424b42424b 22b
7640: 4244494942444949 230
7648: 0000424449494244 19e
7650: 4949000042444949 1aa
7658: 4244494900004244 19e
7660: 4949424449490000 1aa
7668: 4244494942444949 230
7670: 0000424449494244 19e
7678: 4949000046d494d 1bb
7680: 4946494646d494d49 24a
7688: 4649464d494d494d 247
7690: 4946 4d494d494649 24a
7698: 464d494d49464946 247
76a0: 4d494d4946494249 246
76a8: 4249424942494249 22c
76b0: 4249424942494249 22c
76b8: 4249424942494249 22c
76c0: 4249424942494649 230
76c8: 0046490046490046 164
76d0: 4900464900464900 167
76d8: 4649004649004649 1ad
76e0: 0046490046490046 164
76e8: 4900464849000000 120
76f0: 4648490000004648 165
7700: 4900000000000000 049
7708: ++00++3c++2cb+00 424
7710: 2+001010101010101 08+
7718: 1010040404040404 038
7720: 0404040404040404 020
7728: 0404040202080402 01e
7730: 0208040202080802 024
7738: 0204040404041010 036
7740: 0402020804040404 020
7748: 0402020404040404 01c
7750: 0404020204040404 01c
7758: 0404040202040404 01c
7760: 0404040402020404 01c
7768: 0404040404020204 01c
7770: 0404040404040202 01c
7778: 0404040404040402 01e
7780: 0204040404040404 01e
7788: 0202040404020204 018
7790: 0404040202040402 01a
7798: 0204040404020204 01a
77a0: 0402020404040402 01a
77a8: 0204040202040404 01a
77b0: 0402020404020204 018
77b8: 0404040202040402 01a
77c0: 0204040404020204 01a
77c8: 0404020204020202 016
77d0: 0204020204040202 016
77d8: 0402020202040202 014
77e0: 0404020204020202 016
77e8: 0204020204040202 016
77f0: 0402020202040202 014
77f8: 0404020204020202 016
7800: 0204020204040202 016
7808: 0402020202040202 014
7810: 0202020202020202 024
7818: 0202020202020202 02e
7820: 0202020202020202 02e
7828: 0202020202020202 024
7830: 0202020204020208 02c
7838: 0402020810100402 036
7840: 0208040202081010 03a
7848: 0402020804020208 020
7850: 1010040202080402 036
7858: 0208101004020208 03a
7860: 0402020810100402 036
7868: 0208040202081010 03a
7870: 0402020206080804 024
7878: 0202020608080402 022
7880: 0202060808040202 022
7888: 0206080804020202 022
7890: 0608080402020206 026
7898: 0808040404040404 028
78a0: 0404040404040404 020
78a8: 0404040404040404 020
78b0: 0404040404040404 020
78b8: 0404040404040408 028
78c0: 0404080404080404 028
78c8: 0808040804040804 02c
78d0: 0408040408040408 02c
78d8: 0404080404080202 024
78e0: 0c1010102020c10 05c
78e8: 10102020c101010 060
78f0: 1010101080++00++ 2be
78f8: 00++00++00++00d3 3d0
7900: ++20++00++2c1919 37b
7908: 19191919d1d1919 0d0
7910: 1d1d19191d1d191d 0dc
7918: 191d191d191d191d 0d8
7920: 191d191d191d191d 0d8
7928: 191d191d191d1919 0d4
7930: 19191d1d1d1d001d 0c3
7938: 0000000019000000 019
7940: 1919000019191919 096
7948: 1d1d19191d1d1919 0d8
7950: 1d1d1919161d1d19 0d5
7958: 191d1d19191d1d19 0d8
7960: 19161d1d19191d1d 0d5
7968: 19191d1d1919161d 0d1
7970: 1d19191d1d19191d 0d8
7978: 1d1919161d1d1919 0d1
7980: 1d1d19191d1d1919 0d8
7988: 161d1d19191d1d19 0d5
7990: 191d1d1919161924 0d8
7998: 1924192419241924 0f4
79a0: 1924192419241924 0f4
79a8: 1924192419241924 0f4
79b0: 1924192419241924 0f4
79b8: 1924192419240000 0b7
79c0: 1616000016160000 058
79c8: 1d1616160000161 6 08b
79d0: 0000161600001d16 05f
79d8: 1616191919191d1d 0ca
79e0: 1d1d19191919191d 0d8
79e8: 1d1d19191919191d 0d8
79f0: 1d1d19191919191d 0d8
79f8: 1d1d19191919191d 0d8
7a00: 1d1d19191919191d 0d8
7a08: 1d1d19191919191d 0d8
7a10: 1d1d19191919191d 0d8
7a18: 1d1d19191919191d 0d8
7a20: 1d1d19191919191d 0d8
7a28: 1d1d19191919191d 0d8
7a30: 1d1d191b191b191b 0d6
7a38: 191b181918191819 0c7
7a40: 1819181918191819 0c4
7a48: 1819191b1d1e191b 0d4
7a50: 1d1e191b1d1e2500 0cf
7a58: 6101010101010101 068
7a60: 0101010108080808 024
7a68: 0808080808080808 040
7a70: 0808080808080808 040
7a78: 0404040404040404 020
7a80: 0404040404040404 020
7a88: 0404040408080808 030
7a90: 0808080808081010 050
7a98: 1010101010101010 080
7aa0: 1010101010100404 068
7aa8: 0404040404040404 020
7ab0: 0404100404040404 02c
7ab8: 0404040404040410 02c
7ac0: 0404040404040404 020
7ac8: 0404040410040404 02c
7ad0: 0404040404040404 020
7ad8: 0404040404040404 02c
7ae0: 0404040404041004 03c
7ae8: 0404040404040404 020
7af0: 0404041004040404 02c
7af8: 0404040404040404 020
7b00: 0404040404040404 020
7b08: 0404040404040404 020
7b10: 0404040404040404 020
7b18: 0404040404040404 020
7b20: 0404040410101010 050
7b28: 1010101010100202 064
7b30: 0e0e101010101010 07c
7b38: 1010101002020e0e 060
7b40: 0404040404040404 020
7b48: 0404040404040404 020
7b50: 0404040404040404 020
7b58: 0404040404040404 020
7b60: 0404040404040404 020
7b68: 0404040404040404 020
7b70: 0404040404040404 020
7b78: 0404040404040404 020
7b80: 0404040404040404 020
7b88: 0404040404040404 020
7b90: 0808080808080808 040
7b98: 0808080808080808 040
7ba0: 0808080808080808 040
7ba8: 1010101010101010 080
7bb0: 1010101040000101 102
7bb8: 0101010101010101 008
7bb0: 0101 81af90ae81ef 3e0
```

Program 1.

```
10 REM ***********************************
20 REM ***** BACK UP UTILITY *****
30 REM ***** K.R.LASLETT 1985 *****
40 REM ***********************************
50 ON BREAK GOSUB 500
60 INK 0,0:INK 1,26:INK 2,6:INK 3,24
70 BORDER 0:PAPER 0:PEN 1:ORIGIN 0,0:CLS
80 LOCATE 1,25:PRINT"LOADING PLEASE WAIT!"
90 REM ****TAPE****
100 PLOT 120,90:DRAW 120,100,1:DRAW 170,100:DRAW 170,9
0:DRAW 250,90:DRAW 250,80:DRAW 230,80:DRAW 230,77:DRAW
 250,77:DRAW 250,70:DRAW 230,70:DRAW 230,67:DRAW 250,6
7:DRAW 250,60:DRAW 200,60:DRAW 200,50:DRAW 190,50:DRAW
 190,60:DRAW 180,60:DRAW 180,70
110 DRAW 170,70:DRAW 170,60:DRAW 160,60:DRAW 160,90:DR
AW 150,90:DRAW 150,60:DRAW 140,60:DRAW 140,90:PLOT 160
,90:DRAW 170,90:PLOT 170,80:DRAW 180,80:DRAW 180,77:DR
AW 170,77:DRAW 170,80:PLOT 200,80:DRAW 210,80:DRAW 210
,77:DRAW 200,77:DRAW 200,80
120 PLOT 190,90:DRAW 190,60:PLOT 220,90:DRAW 220,60:PL
OT 140,90:DRAW 120,90
130 REM ****IO****
140 PLOT 280,90:DRAW 340,90:DRAW 340,60:DRAW 310,60:DR
AW 310,90:PLOT 310,80:DRAW 300,80:DRAW 300,60:DRAW 290
,60:DRAW 290,80:DRAW 280,80:DRAW 280,90:PLOT 320,80:DR
AW 330,80:DRAW 330,77:DRAW 320,77:DRAW 320,80
150 REM ****TAPE2****
160 PLOT 360,100:DRAW 410,100:DRAW 410,90:DRAW 490,90:
DRAW 490,80:DRAW 470,80:DRAW 470,77:DRAW 490,77:DRAW 4
90,70:DRAW 470,70:DRAW 470,67:DRAW 490,67:DRAW 490,60:
DRAW 440,60:DRAW 440,50:DRAW 430,50:DRAW 430,60:DRAW 4
20,60:DRAW 420,70:DRAW 410,70
170 DRAW 410,60:DRAW 400,60:DRAW 400,90:DRAW 390,90:DR
AW 390,60:DRAW 380,60:DRAW 380,90:DRAW 360,90:DRAW 360
,100:PLOT 400,90:DRAW 410,90:PLOT 410,80:DRAW 420,80:D
RAW 420,77:DRAW 410,77:DRAW 410,80:PLOT 430,90:DRAW 43
0,60:PLOT 460,90:DRAW 460,60
180 PLOT 440,80:DRAW 450,80:DRAW 450,77:DRAW 440,77:DR
AW 440,80
190 REM ****CASSETTE****
200 PLOT 90,320:DRAW 100,330:DRAW 290,330:DRAW 300,320
:DRAW 300,210:DRAW 290,200:DRAW 100,200:DRAW 90,210:DR
AW 90,320:PLOT 120,200:DRAW 130,230:DRAW 260,230:DRAW
270,200:
210 PLOT 150,220:DRAW 158,220:DRAW 158,213:DRAW 150,21
3:DRAW 150,220:PLOT 240,220:DRAW 240,213:DRAW 232,213:
DRAW 232,220:DRAW 240,220:PLOT 170,287:DRAW 220,287:DR
AW 220,275:DRAW 170,275:DRAW 170,287
220 PLOT 330,320:DRAW 340,330:DRAW 530,330:DRAW 540,32
0:DRAW 540,210:DRAW 530,200:DRAW 340,200:DRAW 330,210:
DRAW 330,320:PLOT 360,200:DRAW 370,230:DRAW 500,230:DR
AW 510,200:PLOT 390,220:DRAW 398,220:DRAW 398,213:DRAW
 390,213:DRAW 390,220
230 PLOT 480,220:DRAW 480,213:DRAW 472,213:DRAW 472,22
0:DRAW 480,220:PLOT 410,287:DRAW 460,287:DRAW 460,275:
DRAW 410,275:DRAW 410,287
240 PLOT 100,310:DRAW 110,320,2:DRAW 280,320:DRAW 290,
310:DRAW 290,240:DRAW 100,240:DRAW 100,310:PLOT 340,31
0:DRAW 350,320:DRAW 520,320:DRAW 530,310:DRAW 530,240:
DRAW 340,240:DRAW 340,310
250 PLOT 140,290:DRAW 250,290:PLOT 250,260:DRAW 140,26
0:PLOT 380,290:DRAW 490,290:PLOT 490,260:DRAW 380,260
260 REM ****LOGO****
270 PLOT 70,340,3:DRAW 60,350:DRAW 60,380:DRAW 70,390:
DRAW 100,390:DRAW 110,380:DRAW 110,350:DRAW 100,340:DR
AW 70,340:PLOT 100,350:DRAW 80,350:DRAW 70,360:DRAW 70
,370:DRAW 80,380:DRAW 100,380:DRAW 100,370
```

AMSTRAD TAPE BA

HOW MANY times have you sat there waiting for what seems to be forever for a program to Load? Well type in this program and make back up copies of your slow loading software that will then Load at twice the normal speed. Alternatively, just make security copies at the reliable normal speed.

A problem that I have encountered with the Amstrad is the way in which the speed of cassette mechanisms vary from machine to machine. Some software will only successfully load one in three attempts which is another reason for making one or maybe two back up copies of that brand new game.

Software recorded on your machine will always be pin sharp and reliable to load successfully even at the fast rate. I generally make two copies of my valuable software, one on a C15 at the fast rate and the other on a C90 at normal speed, just in case.

To use the program type in program 1, check it and save it to tape with

SAVE "AMSTRAD BACK UP"

Now type in program 2, check it and again save it to tape with

SAVE "AMSTRAD BACK UP"

Lastly, type in program 3. Before running save the Basic to another cassette with

SAVE "Data"

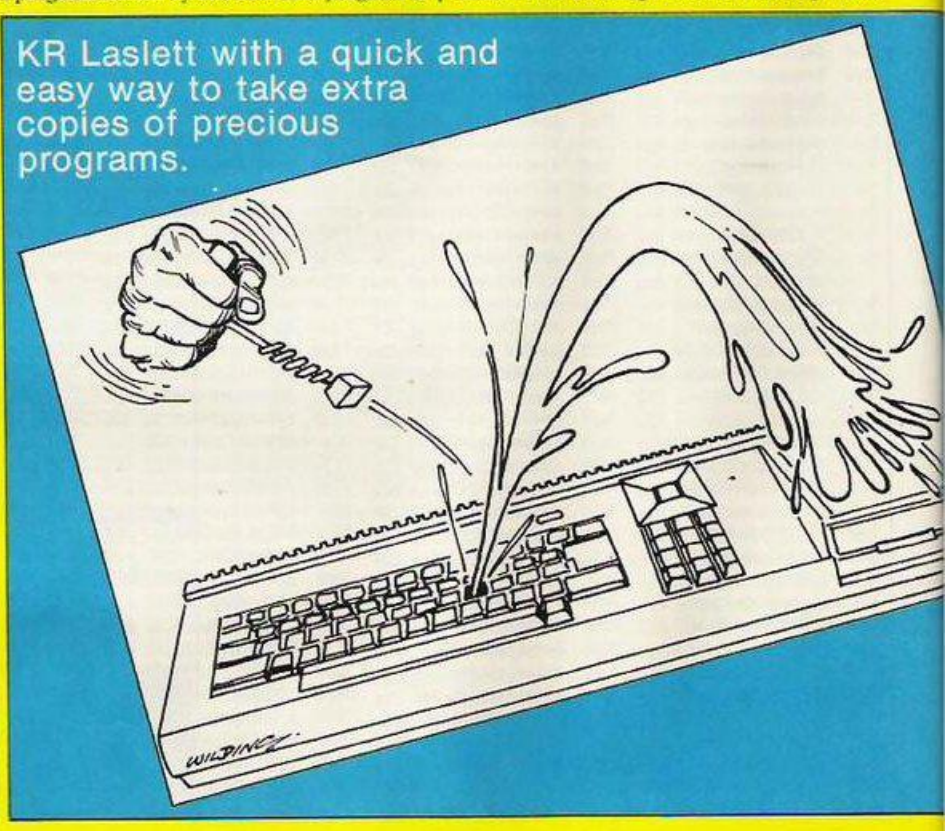
Check it carefully then Run it. Insert your first tape with the first two programs on and Save the resulting code.

Reset computer with Ctrl/Shift/Escape. Rewind tape press Ctrl/small Enter and the program will auto run.

The program is user-friendly in that not many instructions are necessary. If all goes well in the loading the computer will beep at you, and ask Save Speed, just press 1 for Fast or 0 for Normal. You will now be presented with Press Play then any key: which is the standard message you see when you load any program. So why not rewind this tape and make a back up copy of this program just to test it? It copies a program section by section. This program is made up of three sections.

1st section 3 blocks
2nd section 1 block
3rd section 1 blocks

If all is going well, the bottom of the screen should read Loading Amstrad Back Up Block



KR Laslett with a quick and easy way to take extra copies of precious programs.

```
280 DRAW 80,370:DRAW 80,360:DRAW 100,360:DRAW 100,350:
PLOT 120,340:DRAW 120,390:DRAW 140,390:DRAW 140,380:DR
AW 150,390:DRAW 230,390:DRAW 240,370:DRAW 240,390:DRAW
 290,390:DRAW 300,380:DRAW 300,390:DRAW 310,390:DRAW 3
10,340
290 DRAW 290,340:DRAW 280,350:DRAW 280,340:DRAW 250,34
0:DRAW 250,370:DRAW 230,340:DRAW 210,380:DRAW 190,380:
DRAW 190,370:DRAW 200,370:DRAW 200,360:DRAW 190,360:DR
AW 190,350:DRAW 210,350:DRAW 210,340:DRAW 150,340:DRAW
 140,350
300 DRAW 140,340:DRAW 120,340:PLOT 170,390:DRAW 170,34
0:DRAW 150,365:DRAW 170,390:PLOT 210,390:DRAW 210,380:
PLOT 150,390:DRAW 250,370:PLOT 270,390:DRAW 270,340:PL
OT 330,340:DRAW 330,390:DRAW 350,390:DRAW 350,360:DRAW
 370,360
310 DRAW 380,390:DRAW 400,390:DRAW 410,360:DRAW 420,36
0:DRAW 410,370:DRAW 410,390:DRAW 470,390:DRAW 470,360:
DRAW 490,360:DRAW 490,390:DRAW 610,390:DRAW 610,370:DR
AW 600,370:DRAW 600,340:DRAW 580,340:DRAW 580,370:DRAW
 560,370
320 DRAW 560,340:DRAW 540,340:DRAW 540,370:DRAW 530,37
0:DRAW 530,380:DRAW 510,380:DRAW 510,370:DRAW 520,370:
DRAW 520,360:DRAW 510,360:DRAW 510,350:DRAW 530,350:DR
AW 530,340:DRAW 400,340:DRAW 400,350:DRAW 380,350:DRAW
 380,340
330 DRAW 330,340:PLOT 370,360:DRAW 370,340:PLOT 390,37
0:DRAW 380,360:DRAW 400,360:DRAW 390,370:PLOT 450,390:
DRAW 450,340:PLOT 450,350:DRAW 430,370:DRAW 450,370:PL
OT 410,360:DRAW 410,340:PLOT 490,360:DRAW 490,340:PLOT
 530,390:DRAW 530,380
340 PLOT 570,390:DRAW 570,370
350 REM ****ARROW****
360 PLOT 250,150:DRAW 270,165:DRAW 250,180:DRAW 350,16
5:DRAW 330,190:DRAW 380,165:DRAW 330,140:DRAW 350,165:
DRAW 250,150
370 REM ****CIRCLES****
380 PLOT 250,260:DRAW 250,260,2
390 FOR A=0 TO 67:DEG:ORIGIN 245,275:PLOT 16*COS(A),16
*SIN(A):NEXT:ORIGIN 0,0
400 FOR A=292 TO 360:DEG:ORIGIN 245,275:PLOT 16*COS(A)
,16*SIN(A):NEXT:ORIGIN 0,0
410 FOR A=0 TO 67:DEG:ORIGIN 485,275:PLOT 16*COS(A),16
*SIN(A):NEXT:ORIGIN 0,0
420 FOR A=292 TO 360:DEG:ORIGIN 485,275:PLOT 16*COS(A)
,16*SIN(A):NEXT:ORIGIN 0,0
430 FOR A=112 TO 257:DEG:ORIGIN 145,276:PLOT 16*COS(A)
,16*SIN(A):NEXT:ORIGIN 0,0
440 FOR A=112 TO 257:DEG:ORIGIN 385,276:PLOT 16*COS(A)
,16*SIN(A):NEXT:ORIGIN 0,0
450 r%=10:x%=150:y%=275:DEG:ORIGIN x%,y%:FOR i%=1 TO 4
5:a%=r%*COS(i%):b%=r%*SIN(i%):PLOT a%,b%,1:PLOT -a%,b%
:PLOT a%,-b%:PLOT -a%,-b%:PLOT b%,a%:PLOT -b%,a%:PLOT
b%,-a%:PLOT -b%,-a%:NEXT
460 r%=10:x%=240:y%=275:DEG:ORIGIN x%,y%:FOR i%=1 TO 4
5:a%=r%*COS(i%):b%=r%*SIN(i%):PLOT a%,b%,1:PLOT -a%,b%
:PLOT a%,-b%:PLOT -a%,-b%:PLOT b%,a%:PLOT -b%,a%:PLOT
b%,-a%:PLOT -b%,-a%:NEXT
470 r%=10:x%=390:y%=275:DEG:ORIGIN x%,y%:FOR i%=1 TO 4
5:a%=r%*COS(i%):b%=r%*SIN(i%):PLOT a%,b%,1:PLOT -a%,b%
:PLOT a%,-b%:PLOT -a%,-b%:PLOT b%,a%:PLOT -b%,a%:PLOT
b%,-a%:PLOT -b%,-a%:NEXT
480 r%=10:x%=480:y%=275:DEG:ORIGIN x%,y%:FOR i%=1 TO 4
5:a%=r%*COS(i%):b%=r%*SIN(i%):PLOT a%,b%,1:PLOT -a%.b%
:PLOT a%,-b%:PLOT -a%,-b%:PLOT b%,a%:PLOT -b%,a%:PLOT
b%,-a%:PLOT -b%,-a%:NEXT
490 PAPER 0:RUN"!"
500 ORIGIN 0,0:STOP
```

CK-UP

1 etc, to Block 3. Afterwards, automatically the computer responds with Press Rec and Play then any key, which instructs you to place your back up tape into the machine, press appropriate buttons and any key.

A powerful feature on this program is the Save again option which when your three blocks have been Saved should appear on the bottom of the screen. Simply press Y for yes or N for no. Upon pressing Y the section will be Saved again, on pressing N the program will go back to Press Play then any key in which case carry on with the next section etc.

The program as it stands will transfer a section up to about 22 blocks in length which in most cases will be sufficient. You should become accustomed to this program very quickly as it's very easy to use and the screen always tells you what's going on.

If you get the message "read error a" or a similar message which tells you there's a tape loading error, don't despair press Escape, rewind the tape and load the section again. I've tried to make the program as crash-proof as possible ie, if Escape is pressed during Loading the program will call a routine to reset the cassette manager and call the load routine once more.

If the program hasn't operated as described then re-load the machine code loader, if you save it separately on a tape — program 3 — and check the data carefully. Then re-Save the resultant code. Then try again.

If anybody doesn't want the task of typing in the program, tape copies are available with full instructions from: Mr. K.R. Laslet, 12 Wintour House, Loweswater Close, Wembley HA9 8UF at £3.00 per copy. ■

Program 2.

```
5 REM ********************************
10 REM ***** BASIC CONTROL PROGRAM ****
15 REM ********** K.R.LASLETT *********
20 REM ********************************
25 MEMORY 42999:LOAD"!"
30 WINDOW 1,40,24,25:CALL &BC65:CLS:PRINT CHR$(7):PRIN
T"INPUT SAVE SPEED":PRINT"0-NORMAL OR 1-FAST."
40 A$=INKEY$:IF A$="" GOTO 40
50 IF A$="1" THEN SPEED WRITE 1
60 CLS:PRINT CHR$(7):CALL 43000
70 CLS:PRINT CHR$(7):PRINT"SAVE AGAIN":PRINT"YES OR NO
"
80 B$=INKEY$:IF B$="" GOTO 80
90 IF B$="Y" OR B$="y" THEN 110
100 GOTO 60
110 CLS:PRINT CHR$(7):CALL &A823:GOTO 70
```

Program 3.

```
 10 REM MACHINE CODE LOADER
 20 MEMORY 42999
 30 FOR address=43000 TO 43095
 40 READ byte:POKE address,byte
 50 NEXT address
 60 SAVE"AMSTRAD BACK UP",B,43000,96
 65 END
100   DATA &06,&00,&21,&E8,&03,&11,&28,&04
110   DATA &CD,&77,&BC,&D2,&4C,&A8,&22,&EA
120   DATA &03,&ED,&53,&EC,&03,&ED,&43,&EE
130   DATA &03,&32,&F0,&03,&21,&28,&0C,&CD
140   DATA &83,&BC,&D2,&4C,&A8,&22,&F1,&03
150   DATA &CD,&7A,&BC,&06,&10,&2A,&EA,&03
160   DATA &11,&28,&04,&CD,&8C,&BC,&D2,&52
170   DATA &A8,&22,&F3,&03,&21,&28,&0C,&ED
180   DATA &5B,&EE,&03,&ED,&4B,&F1,&03,&3A
190   DATA &F0,&03,&CD,&98,&BC,&D2,&52,&A8
200   DATA &CD,&8F,&BC,&C9,&CD,&7D,&BC,&C3
210   DATA &F6,&A7,&CD,&92,&BC,&C3,&F8,&A7
```

We'll take you beyond the Spectrum.

Four great new add-ons from Ram, Number One in everything for the Spectrum...

TURBO INTERFACE

Outperforms any other Spectrum interface. Supports Kempston, Protek, Interface 2 and ROM cartridge software, with a full expansion bus at the rear. The Turbo works with two standard joysticks, making the most of the Quickshot II's rapid-fire action. Features a unique built-in power safety device. Amazing value at £22.95.

QUICKSHOT II AUTO RAPID-FIRE JOYSTICK

The top games joystick with its sleek trigger fire button and an auto-fire switch for continuous shooting – a snip at only £9.95.

SPECTRUM INTERFACE

This Kempston-compatible interface adds real games power to your Spectrum. Costs just £9.95.

SPECTRUM UPGRADE KIT

Boost your 16K Spectrum to a full 48K, allowing you to run all the latest and greatest software. Only £21.95

Where can you get your hands on Ram's amazing Spectrum add-ons? You can see them at branches of Boots, Menzies, Greens, Spectrum Group computer centres, and good computer stores everywhere.

Ram Electronics (Fleet) Ltd (Dept YC), 106 Fleet Road, Fleet, Hampshire GU13 8PA.
Credit Card hot line: *02514 25252. (Access & Visa).*

Please send me ____ Spectrum Turbo Interface(s) at £22.95.
____ Quickshot II Joystick(s) at £9.95.
____ Spectrum Interface(s) at £9.95.
____ Spectrum Upgrade Kit(s) at £21.95.
(Please state issue 2 ☐ or 3 ☐)

+£1 per order P+P (£3 Overseas) **TOTAL £**

☐ I enclose cheque/postal order ☐ charge my Access/Visa

Expiry Date____/____/____

Name

Address

Postcode

Telephone

24 Hour despatch for credit cards and postal orders (7 days for cheques.) All products are fully compatible with the Spectrum, Spectrum + and Sinclair Microdrives.

Ram Electronics (Fleet) Ltd
(Dept YC), 106 Fleet Road,
Fleet, Hampshire GU13 8PA.

Trade and Export enquiries welcome.

TOP★TIPS

LISTER

This short machine code program formats the listing so that each statement is printed on a new line and indented. Since Basic regards If . . . Then as two statements these are also separated.

The routine it can be saved to tape with:

SAVE "lister" 65368,66

To use the routine:

PRINT: RANDOMIZE USR address to LIST to the screen

or by

PRINT =3: RANDOMIZE USR address to send to the Printer.

Alan Mynott.

```
100 REM Mcr Lister
110 RESTORE 1000
120 REPO Address:statement
150 PRINT TAB 10 "Loading Code"
160 FOR Ln=1 TO statement
170 REPO ln: LET address=16 TO
LET checksum=0
180 FOR ln=1 TO 16 STEP 8
190 LET h$=inkey$: IF h$="" GO SUB
200
200 POKE address,byte
210 LET address=address+1: LET
checksum=checksum+
220 NEXT ln
230 IF checksum<>1000 THEN BEEP
.5,24: LET line=1000+10: LET c
ONT 2668: LET line=line+10: CONT
0: LET line=line+10: REPO 1: IF
n=0 THEN LIST line: STOP
240 IF checksum=1000 THEN PRINT
"Correct": CLEAR 1000: LIST
250 STOP
260 REM Variables
300 REM 11 TO 1 STEP -1: LET byte=byte
+peek PEEK 23756+ln*8+(ln>9)*(ln
-9)*7
310 RETURN
1000 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
1010 DATA 1,62,0,0,0,0,0,0,0,0,0,0,0,0,0,0
1020 DATA 1,62,0,0,0,0,0,0,0,0,0,0,0,0,0,0
1030 DATA 1,62,1,0,0,0,0,0,0,0,0,0,0,0,0,0
1040 DATA 1,62,1,0,0,0,0,0,0,0,0,0,0,0,0,0
1050 DATA 1,62,1,0,0,0,0,0,0,0,0,0,0,0,0,0
1060 DATA 1,62,1,0,0,0,0,0,0,0,0,0,0,0,0,0
1070 DATA 1,62,1,0,0,0,0,0,0,0,0,0,0,0,0,0
1080 DATA 1,62,1,0,0,0,0,0,0,0,0,0,0,0,0,0
1090 DATA 1,62,0,0,0,0,0,0,0,0,0,0,0,0,0,0
```

UTILITY PROGRAM

I find this short machine code program extremely useful when writing large programs involving printing control characters.

To enable the program, type SYS 5E4 (50000). This has to be typed after typing New because the IRQ vector is reset. This also occurs after pressing Run/Stop and Restore.

Matthew Wilkes.

```
100 RESTORE
110 FOR I=50000 TO 50012
120 READ D:POKE I,D
130 NEXT
140 FOR I=49152 TO 49197
150 READ D:POKE I,D
160 NEXT
170 REM TYPE 'SYS 5E4'
180 REM TO ENABLE
190 DATA120,169,0,141,20
200 DATA3,169,192,141,21
210 DATA3,88,96,32,159
220 DATA255,166,198,208,3
230 DATA76,49,234,202,169
240 DATA119,2,201,133,208
250 DATA8,169,0,141,212,0
260 DATA76,49,234,201,134
270 DATA240,3,76,49,234
280 DATA169,255,141,212
290 DATA0,169,0,141,198
300 DATA0,76,49,234
```

RESPONSE *Frame*

Do you have a problem related to your micro? Tim Hartnell will do his best to help. Please include only one question per letter and mark it "Response Frame". Alternatively, perhaps you have an idea you'd like to pass on to others. Why not write to us with your top tips?

'CHEQUE BOOK'

■ I recently bought an adventure game set in space for my Amstrad. The program used normal text printout, but all the numbers on the screen were like those seen at the bottom of cheques. I have looked all through the character set, including getting my Amstrad to printout the characters from 128 to 255, and I cannot find these "cheque numbers". How did the people who wrote the adventure do it?

Martin Wiaba,
Witham,
Essex.

IT IS LIKELY that the standard numbers in the Amstrad character set were redefined, using the Symbol command. The following routine, which you can use in combination with any programs, will produce numbers as requested by you.

```
10 REM "Cheque-book" numerals
20 SYMBOL AFTER 48
30 SYMBOL 48,0,60,66,66,98,98,98,60
40 SYMBOL 49,0,8,8,8,12,12,12,12
50 SYMBOL 50,0,124,2,2,60,96,96,62
60 SYMBOL 51,0,124,2,2,60,6,6,126
70 SYMBOL 52,0,64,96,100,100,126,4,4
80 SYMBOL 53,0,62,64,64,60,6,6,126
90 SYMBOL 54,0,62,64,64,124,70,70,126
100 SYMBOL 55,0,120,8,8,12,12,12,12
110 SYMBOL 56,0,60,66,66,60,70,70,60
120 SYMBOL 57,0,60,66,66,60,6,6,126
```

DRAGON BUG?

■ While writing a program on the Dragon 32, I came across a quite interesting messate. Error messages on the Dragon generally consist only of two letters, such as SN Error, but during the execution of one program I got two *words*. The Dragon was waiting for an ordinary input response, and I entered "Bill, Fred". The Dragon replied "Extra Ignored", and asked for the input again. It seems the Dragon ignores everything following the comma. I've tried everything else, such as semi-colons, but they do not work.

S J Lawton,
Barnsley,
South Yorkshire.

MANY COMPUTERS will behave in just the same way as your Dragon when presented with a comma within an input. You can only use this if you allow for more than one variable to be assigned with the word Input, as in:

INPUT "ENTER NAME"; A$, B$

If you do this, you'll find the computer will accept input separated by a comma, and will assign the material to the left of the comma to the first variable (A$) and the rest of the material to the second one (B$).

VAL ON THE QL

■ I have recently received a QL and am generally very pleased with it, having previously owned a BBC Model B and a 48K Spectrum. On trying to convert some Spectrum programs, I've discovered that omissions from SuperBasic make it fairly difficult. I know about coercion, but stil find I need Val on the QL. Is there any way of making a Val function? Lastly, is the JM the lastest version of the computer available? I have an AH version. Finally, could you tell me how long it takes to load Quill? I wish to know if my Microdrives are as fast as they should be.

S Tomasini,
Dartmouth,
Devon.

THE ONLY WAY to emulate Val on the QL is to make use of coercion, but *test* the output before printing the result on the screen. The material you are Valling should be of a predictable type, and you might find that adding, or subtracting, 0.5 gives the answer you want — and perhaps using INT as well.

The latest version of the QL out, at the time of going to press, is the JS, which is significantly better than JM, which is the version which immediately preceded it. It includes good error-trapping.

Version 1.1 of QDOS, in the JS Rom, runs Microdrives more quickly than the earlier version. However, because Quill itself has been progressively improved, the time it takes to load depends almost entirely on which Quill you have, rather than the speed with which your Microdrives work. The first version of Quill, on the first (kludged) QL's, took some 70 seconds to load. The time is now down to 20 or less.

DRIVE PROBLEM

■ I have a Sinclair Microdrive and several cartridges. After fairly heavy use of the cartridges, one started to act strangely. I got the message "Microdrive not present" when I tried to catalogue, load or save. The first time this happened, I thought it was a one-off, and threw away the cartridge. However, after buying a new one, the same thing happened after a couple of weeks. How can I get the information back?

P D Scott,
Crewe.

SINCLAIR ALWAYS advises users of the Spectrum to make backup copies of important programs. Whenever I am developing a major program on the Spectrum, I save and resave, using a name which ends with the number of the version I'm saving. I save the partially completed programs on two different cartridges, alternating the saves, so that if one goes down I still have a fairly recent version available. available.

It sounds to me as if you are giving your cartridges very heavy use. Perhaps you should make sure you do not use one exclusively from now on, and make back up copies frequently, on other cartridges. If you can borrow a second Microdrive, it would be worth trying to copy from your cartridge onto another one, placing your cartridge in the borrowed drive, rather than in your own drive.

Check that the edge connector on your Microdrive is completely clean, by rubbing it gently with an ordinary pencil rubber — and making sure bits of rubber don't get into the works!

In an earlier issue of Your Computer, *I gave a routine to simulate on the Spectrum the Left$, Right$ and Mid$ string-handling commands used in most other Basics. Andy Gibbons on Peterborough suggests that it is simpler if the Def FN function is used, and outlines the following simple implementations of the standard string-handling, to simplify program conversions:*

```
10 DEF FN L$ (A$,X) = A$ ( TO
X): REM LEFT$
20 DEF FN R$ (A$, X) = A$ (X
+ 1 TO): REM RIGHT$
30 DEF FN M$ (A$, X, Y) = A$
(X TO (X + Y) - 1): REM MID$
```

Spitfire 40

CHOCKS AWAY!

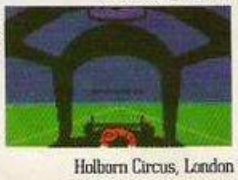
THE BEST THING SINCE THE REAL THING

A Spitfire flight simulation set in 1940. Ground features and realistic air combat.

Spitfire'40 is available from W H Smith, Boots, Spectrum and good software stores everywhere.

MIRRORSOFT

MIRRORSOFT, Mirror Group Newspapers Ltd



Holborn Circus, London EC1P 1DQ Tel: 01-822 3580

A VERY SPECIAL COMPETITION

Target: To rise through the ranks of the RAF elite to Group Captain, VC, DSO, DFC

Reward: For the lucky few, a day out at the Battle of Britain Museum plus a test flight in a high performance aircraft. Details in every *Spitfire'40* pack

COMMODORE 64 (JOYSTICK ONLY)
DISK £12.95/CASSETTE £9.95

SOFTWARE File

Programs for Software File should be fairly compact and sent on a cassette. Please include clear instructions and say what computer it's for. We pay between £6 and £36 for programs published. They must be double-checked and submitted

Vampire and priest

Adam Murray,
12 AD Regt.,
BFPO 20.

Amstrad

VAMPIRE AND PRIEST is a two-player game for the Amstrad CPC-464 and occupies just over 8K. It makes use of both sound and graphics with the latter being in Mode 0 — low resolution with 15 colours.

The game itself is written entirely in Amstrad Basic and is explained with the use of remark statements which can be left out when typing in the program.

Full instructions of how to play the game are provided within the program as is an option to change the skill level.

Provisions have been made for each player to use a joystick but with a few simple changes any keyboard/joystick layout is possible. This is how you do it.

Turn to appendix III page 16 of the user manual which should show a picture of the keyboard with appropriate values written on the individual keys.

Now look at lines 110 and 120. These hold the values of the keys to be used, and can be changed to your own choice. Initially they are set to use joysticks. The variable names are short but meaningful, e.g. VU%= key to use to move vampire up, PF%= key to use as fire for priest etc.

The routine between 560-630 is a simple fill routine and could be placed outside the program if the following parameters are passed: x%-X co-ord to start filling from. y%-Y co-ord to start filling from. c%- the colour to use in filling the area. In this case it must be the same as the outline of the shape. This could easily be changed to suite your own purposes.

I have used this routine to fill the church and castle at the start of the game and although slow does not need to be repeated after every game.

If all is well there should be a tuneful version of Greensleeves playing in the background. This is achieved simply by using the interrupts in the form of ON SQ(?) Gosub.

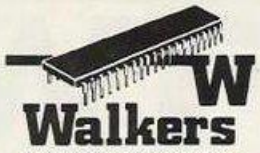
I think this program demonstrates what can be done with Locomotive Basic and without special techniques.

```
10 '****************************
20 '****   PRIEST AND VAMP.  ****
30 '****          1985.      ****
40 '****        FOR THE      ****
50 '****  AMSTRAD CPC464.    ****
60 '****    WRITTEN   BY     ****
70 '****    ADAM MURRAY.     ****
80 '****************************
90 '
100 MODE 0
110 VU%=48:VD%=49:VL%=50:VR%=51:VF%=52
 'KEYS FOR VAMP
120 PU%=72:PD%=73:PL%=74:PR%=75:PF%=76
 'KEYS FOR PRIEST
130 no%=0:GOTO 180
140  no%=no%+1:IF no%=39 THEN RESTORE
160:no%=0
150 READ d%,n%:SOUND 1,n%,d%,15,1,4:RE
TURN
160 DATA 25,568,50,478,25,426,37,379,1
2,358,25,379,50,426,25,506,37,638,12,5
68,25,506,50,478,25,568,37,568,12,602,
25,568,50,506,25,602,50,758,25,568
170 DATA 50,478,25,426,37,379,12,358,2
5,379,50,426,25,506,37,638,12,526,25,5
06,37,478,12,506,25,568,37,606,12,677,
25,638,75,568,50,568,0,0
180 BORDER 11
190 SK%=500
200 ENV 1,10,-1,2
210 FOR i%=0 TO 15:INK i%,i%:NEXT
220 SYMBOL AFTER 229
230 '
240 'define graves
250 '
260 SYMBOL 230,0,0,24,60,110,94,255,25
5
270 '
280 'define priest
290
300 SYMBOL 232,60,60,255,60,60,24,255,
255
310 SYMBOL 233,255,189,189,189,189,126
,126,126
320 SYMBOL 234,126,126,126,126,228,4,4
,7
330 SYMBOL 235,126,126,126,39,32,32,22
4
340 '
350 'define vampire
360
370 SYMBOL 236,112,249,61,63,15,15,3,3
380 SYMBOL 237,14,143,188,252,240,240,
192,192
390 SYMBOL 238,1,1,7,31,63,57,48,32
400 SYMBOL 239,128,128,224,248,252,156
,12,4
410 '
420 'DEFINE WINDOWS
430 '
440 SYMBOL 240,0,0,24,52,82,82,145,145
450 SYMBOL 241,255,145,145,145,145,145
,145,255
460 '
470 'DEFINE GRASS
480 '
490 SYMBOL 242,32,34,148,72,42,26,40,1
6
500 '
510 GOSUB 2460'instructions
520 GOTO 810
530 '
540 'FILL ROUTINE
550 '
560 xo%=x%:yo%=y%
570 xo%=x%:yo%=y%
580 WHILE TEST(x%,y%)<>c%:PLOT x%,y%,c
%:x%=x%+4:WEND
590 x%=xo%-4
600 WHILE TEST(x%,y%)<>c%:PLOT x%,y%:
x%=x%-4:WEND
610 x%=xo%
620 IF TEST(x%,y%+2)<>c% THEN y%=y%+2:
GOTO 580
630 RETURN
640 '
650 IF TEST (xv%+32,yv%-16)<>6 THEN RE
TURN
660 SOUND 4,200,3,7:TAGOFF:PRINT CHR$(
23)+CHR$(0);:TAG
670 PLOT -10,0,10:MOVE (xv%+16),(yv%+8
):PRINT CHR$(230);:MOVE (xv%+16),(yv%-
8):PRINT CHR$(143);
680 TAGOFF:PRINT CHR$(23)+CHR$(1);:TAG
690 PLOT -10,0,9
700 wc%=wc%-1:IF wc%=0 THEN vopw%=1
710 RETURN
720 '
730 IF TEST (xp%+16,yp%-32)<>10 THEN R
ETURN
740 SOUND 4,100,3,7:TAGOFF:PRINT CHR$(
23)+CHR$(0);:TAG
750 PLOT -10,0,6:MOVE xp%,(yp%-16):PRI
NT CHR$(230);:MOVE xp%,(yp%-32):PRINT
CHR$(143);
760 TAGOFF:PRINT CHR$(23)+CHR$(1);:TAG
770 PLOT -10,0,8
780 wc%=wc%+1:IF wc%=24 THEN vopw%=1
790 RETURN
800 '
810 BORDER 11:INK 0,13
820 FOR i%=1 TO 15:INK i%,i%:NEXT
830 PRINT CHR$(23)+CHR$(0)
840 a$=CHR$(230)+" "+CHR$(230)+" "+CHR
$(230)+" "+CHR$(230)
850 b$=CHR$(143)+" "+CHR$(143)+" "+CHR
$(143)+" "+CHR$(143)
860 '
870 'set skyline
880 '
890 INK 13,26
900 PEN 2:LOCATE 1,1:PRINT STRING$(C%,
143)
910 PEN 14:LOCATE 1,5:PRINT STRING$(80
,143)
920 PEN 13:LOCATE 1,9:PRINT STRING$(60
,143)
930 FOR I%=1 TO 20:LOCATE I%,11:PAPER
13:PEN 12:PRINT CHR$(242):NEXT
940 FOR i%=1 TO 3
950 PEN 0:LOCATE 3,8+i%:PRINT STRING$(
4,143):LOCATE 14,8+i%:PRINT STRING$(3,
143)
960 NEXT
970 MOVE 0,225:DRAWR 640,0,0
980 '
990 'draw castle
1000 '
1010 RESTORE 1040
1020 MOVE 66,226
1030 FOR dr%=1 TO 45:READ x%,y%:DRAWR
x%,y%,3:NEXT
1040 DATA 0,55,-10,10,-10,0,0,24,-4,16
,-10,0,0,34,14,4
1050 DATA 0,-14,14,0,2,12,16,0,0,-6,12
,-2,6,6,0,14
1060 DATA 18,0,0,-30,-10,-10,16,-4,0,-
16,40,0,0,12
1070 DATA 10,10,0,10,-10,10,0,20,12,8,
0,-14,9,0
1080 DATA 9,18,10,0,0,-18,14,0,0,16,14
,0,-4,-60,-16,0
1090 DATA -14,-20,0,-85,-19,0,0,47,-96
,0,0,-47,-14,0
1100 '
1110 'draw church
1120 '
1130 RESTORE 1160
1140 MOVE 400,226
1150 FOR dr%=1 TO 11:READ x%,y%:DRAWR
x%,y%,15:NEXT
1160 DATA 0,90,35,80,35,-90,100,0,20,-
20,0,-60,-75,0,0,47,-100,0,0,-47,-10,0
1170 '
1180 'fill castle
1190 '
1200 c%=3
1210 FOR i%=1 TO 7:READ x%,y%:GOSUB 56
0:NEXT
1220 DATA 71,229,101,359,40,355,193,31
8,220,375,169,375,180,229
1230 '
1240 'fill church
1250 '
1260 c%=15
1270 FOR i%=1 TO 3:READ x%,y%:GOSUB 56
0:NEXT
1280 DATA 411,229,432,334,516,229
1290 RESTORE 160
1300 LOCATE 3,4:PEN 0:PAPER 3:PRINT CH
R$(240)CHR$(8)CHR$(10)CHR$(241)
1310 LOCATE 18,8:PAPER 15:PRINT CHR$(2
40)CHR$(8)CHR$(10)CHR$(241)
1320 PAPER 0
1330 '
1340 'set up graves
1350 '
```

(continued on page 103)

SINCLAIR, ATARI
COMMODORE

COMPUTER REPAIRS
by the
SPECIALISTS



COMPUTER SERVICE
AND REPAIRS

Telephone 021 643 5474
Telegrams
Shiplog Birmingham
Telex 337124 TWSLOG G

WALKERS will repair your MICRO quickly and efficiently.

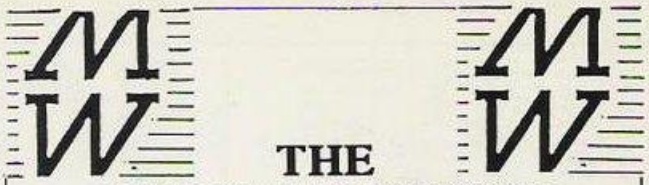
Services available to suit the Customers requirements include "one-off" repairs and Quotations.

Most Repairs will be in the range
£15 to £30
subject to machine

FOR INFORMATION
PHONE 021-643 5474

CALL IN AT
58 OXFORD STREET, BIRMINGHAM, B5 5NX

OR SEND S.A.E. FOR DETAILS



THE MICRO WORKSHOP

MICRO COMPUTER SPECIALISTS

(Spectrum Group Member)

Software and hardware over the counter for Sinclair Spectrum, BBC, CBM-64, Memotech, Amstrad, Einstein, etc.

* COMPUTERS
* RAMPACKS
* JOYSTICKS
* BOOKS
* KEYBOARDS
* DISCS
* TAPES
* LIGHT PENS
* COMPONENTS *

Educational/Business Programs available.
Located directly opposite Epsom Main Line Station. Visit us or ring for friendly service. See and try before you buy.

★ In house programming ★

Overseas/Export orders welcome

12 STATION APPROACH
EPSOM, SURREY.
EPSOM 21533

TIPSTER
SPECTRUM+/48
AMSTRAD CPC464/COMMODORE 64

The most accurate horse race predictor on the market

★ Tipster V2 took 18 months of trial and error before we arrived at the system that makes it the most accurate race predictor on the market.
★ Fully tested against other computer race predictors.
★ Tipster even performs better than the human tipsters from the top nine newspapers.
★ Many winners found at high prices.
★ For both flat and national racing.
★ The system will never go out of date.
★ We reveal the secrets of profitable betting.
★ Special tutor for the absolute beginner to racing.
★ Tipster also includes a program to calculate your returns for you.

If you can buy a more accurate race predictor we'll refund your money

Don't be tempted to buy cheap or inferior products.
£14.95

E. I. SYSTEMS
PO Box 171, Wolverhampton, West Midlands WV10 0PJ

Leaves all other race predictors in the paddocks.
(Please state computer)

PD133

THE VIKINGS ARE COMING!!!

SWESCOT are proud to announce that we will soon be releasing several top quality programmes on the international market, made by some of Sweden's most proficient programmers.
And best of all.....PRICES FROM **£1.99**
Du som bor i Skandinavien och söker bra program till din hemdator.

KONTAKTA OS!!!

Vi har det mesta som finns i denna tidning till ***samma*** laga priser som gäller i England. Dessutom far vi in alla nyheter ***samtidigt*** som de släpps i England.

OBS!!! Vid katalogbeställning v.g. medsänd 5:– Skr i frimärken för portot.

SWESCOT

Box 213
121 02 Johanneshov
Sweden
08/39 27 00 – 08/81 18 01

(continued from page 101)

```
1360 INK 10,20:INK 6,24
1370 FOR y%=14 TO 22 STEP 4
1380 LOCATE 2,y%:PEN 10:PRINT a$
1390 LOCATE 2,y%+1:PEN 10:PRINT b$
1400 NEXT
1410 FOR y%=14 TO 22 STEP 4
1420 LOCATE 13,y%:PEN 6:PRINT a$
1430 LOCATE 13,y%+1:PEN 6:PRINT b$
1440 NEXT
1450 '
1460 'set up variables
1470 '
1480 xp%=416:yp%=270 'co-ord of priest
1490 xv%=80:yv%=246  'co-ord of vampir
e
1500 wc%=12
1510 tod=1:vopw%=0
1520 '
1530 'start of main game
1540 '
1550 PRINT CHR$(23)+CHR$(1);
1560 TAG
1570 PLOT -10,0,8
1580 MOVE xp%,yp%:PRINT CHR$(232);:MOV
E xp%,(yp%-16):PRINT CHR$(233);:MOVE x
p%,(yp%-32):PRINT CHR$(234);
1590 PLOT -10,0,9
1600 MOVE xv%,yv%:PRINT CHR$(236)+CHR$
(237);
1610 TAG
1620 '
1630 'main game loop
1640 '
1650 time1=TIME+SK%+INT(RND*1000)
1660 WHILE time1>TIME AND vopw%=0
1670 IF (XP%-XV%)=16 AND (YP%-YV%)=24
 THEN vopw%=1
1680 PLOT -10,0,8:MOVE xp%,yp%:PRINT C
HR$(232);:MOVE xp%,(yp%-16):PRINT CHR$
(233);:MOVE xp%,(yp%-32):PRINT CHR$(23
4);
1690 IF xp%<320 AND yp%>200 THEN 1710
1700 IF INKEY(PU%)=0 AND TEST(xp%+16,y
p%+30)=0 THEN yp%=yp%+32
1710 IF INKEY(PD%)=0 AND yp%>48 THEN
yp%=yp%-32
1720 IF INKEY(PL%)=0 AND TEST(xp%-4,yp
%)<>15 AND xp%>32 THEN  xp%=xp%-32
1730 IF INKEY(PR%)=0 AND TEST(xp%+32,y
p%)<>15 AND xp%<560 THEN  xp%=xp%+32
1740 MOVE xp%,yp%:PRINT CHR$(232);:MOV
E xp%,(yp%-16):PRINT CHR$(233);:MOVE x
p%,(yp%-32):PRINT CHR$(235);
1750 '
1760 PLOT -10,0,9
1770 MOVE xv%,yv%:PRINT CHR$(236)CHR$(
237);
1780 IF xv%>320 AND yv%>200 THEN 1800
1790 IF INKEY(VU%)=0 AND TEST(xv%+28,y
v%+30)=0 THEN yv%=yv%+32
1800 IF INKEY(VD%)=0 AND yv%>32 THEN y
v%=yv%-32
1810 IF INKEY(VL%)=0 AND TEST(xv%-4,yv
%)<>3 AND xv%>=32 THEN xv%=xv%-32
1820 IF INKEY(VR%)=0 AND TEST(xv%+64,y
v%)<>3 AND xv%<=530 THEN xv%=xv%+32
1830 MOVE xv%,yv%:PRINT CHR$(238)CHR$(
239);
1840 ON SQ(1) GOSUB 140
1850 PLOT -10,0,8:MOVE xp%,yp%:PRINT C
HR$(232);:MOVE xp%,(yp%-16):PRINT CHR$
(233);:MOVE xp%,(yp%-32):PRINT CHR$(23
5);
1860 IF INKEY(PF%)=0 AND tod=1 THEN GO
SUB 730
1870 MOVE xp%,yp%:PRINT CHR$(232);:MOV
E xp%,(yp%-16):PRINT CHR$(233);:MOVE x
p%,(yp%-32):PRINT CHR$(234);
1880 PLOT -10,0,9
1890 MOVE xv%,yv%:PRINT CHR$(238)CHR$(
239);
1900 IF INKEY(VF%)=0 AND tod=2 THEN GO
SUB 650
1910 MOVE xv%,yv%:PRINT CHR$(236)CHR$(
237);
1920 WEND
1930 IF vopw%=1 THEN GOTO 1970
1940 SOUND 2,150,3,7,0,0,10
1950 IF tod=1 THEN INK 2,9:INK 14,21:I
NK 13,19:BORDER 18:INK 0,0:tod=2:GOTO
1610
1960 INK 2,2:INK 14,14:INK 13,26:BORDE
R 11:tod=1:INK 0,13:GOTO 1610
1970 IF tod=2 THEN GOTO 2010 ELSE GOTO
 2180
1980 '
1990 'vamp win
2000 '
2010 TAGOFF
2020 PRINT CHR$(23)+CHR$(0);
2030 TAG
2040 PLOT -10,0,0
2050 MOVE xp%,yp%:PRINT CHR$(143);:MOV
E xp%,yp%-16:PRINT CHR$(143);:MOVE xp%
,yp%-32:PRINT CHR$(143);
2060 TAGOFF
2070 PRINT CHR$(23)+CHR$(1);
2080 PEN 15
2090 FOR r%=12 TO 24
2100 INK 0,RND*26
2110 LOCATE 6,r%:PRINT"Evil wins"
2120 SOUND 1,r%*10,1,7
2130 NEXT:INK 0,0:RESTORE 2310
2140 GOTO 2300
2150 '
2160 'priest win
2170 '
2180 TAGOFF
2190 PRINT CHR$(23)+CHR$(0)
2200 TAG
2210 PLOT -10,10,0
2220 MOVE xv%,yv%:PRINT CHR$(143);:MOV
E xv%+32,yv%:PRINT CHR$(143);
2230 TAGOFF
2240 PRINT CHR$(23)+CHR$(1);
2250 FOR r%=12 TO 24
2260 INK 0,RND*26
2270 LOCATE 6,r%:PEN 8:PRINT"Good wins
"
2280 SOUND 1,r%*10,1,7
2290 NEXT:INK 0,0:RESTORE 2310
2300 FOR d%=1 TO 26:READ n%:SOUND 1,n%
*4,20,7:SOUND 2,n%,20,7:NEXT
2310 DATA 60,53,47,45,60,0,45,47,45,40
,53,0,53,0,53,47,45,36,40,40,45,45,47,
53,47,60
2320 FOR i%=0 TO 13:LOCATE 1,1:PRINT C
HR$(11):NEXT
2330 GOTO 2350
2340 '
2350 'another go
2360 '
2370 INK 1,1+RND*26
2380 LOCATE 3,7:PRINT "Another go Y/N?
"
2390 IF INKEY(43)=0 THEN no%=0:RESTORE
 160:GOTO 2420
2400 IF INKEY(46)=0 THEN RUN
2410 GOTO 2370
2420 FOR i%=0 TO 13:LOCATE 1,26:PRINT
CHR$(8):NEXT
2430 GOTO 1330
2440 NEXT
2450 '
2460 'instructions
2470 '
2480 INK 0,26:INK 13,3,8
2490 LOCATE 5,1:PEN 12:PRINT"****Instr
uctions****"
2500 LOCATE 3,10:PEN 13:PRINT"press sp
ace to cont."
2510 LOCATE 3,18:PEN 9:PRINT"press S t
o start."
2520 IF INKEY(60)=0 THEN CLS:RETURN
2530 IF INKEY$=" " THEN GOTO 2540 ELSE
 GOTO 2520
2540 GOSUB 3060
2550 LOCATE 1,8:PEN 3:PRINT"******Vamp
ire-******"
2560 LOCATE 9,10:PRINT CHR$(238);CHR$(
239)
2570 LOCATE 2,13:PEN 9:PRINT "up down
left right"
2580 LOCATE 5,15:PEN 11:PRINT "joy sti
ck 1"
2590 IF INKEY$<>" "THEN 2590
2600 GOSUB 3060
2610 LOCATE 1,8:PEN 6:PRINT"******Prie
st-*******"
2620 LOCATE 10,10:PEN 4:PRINT CHR$(232
);CHR$(10);CHR$(8);CHR$(233);CHR$(10);
CHR$(8);CHR$(234)
2630 LOCATE 2,14:PEN 9:PRINT "up down
left right"
2640 LOCATE 5,16:PEN 11:PRINT "joy sti
ck 0"
2650 IF INKEY$<>" "THEN 2650
2660 GOSUB 3060
2670 IF INKEY$<>" "THEN 2670
2680 MODE 1:INK 1,0:INK 2,7,8
2690 PRINT"THE PRIEST MUST CHANGE ALL
THE CYAN"
2700 PRINT"GRAVES TO YELLOW AND THE VA
MPIRE SHOULD"
2710 PRINT"DO THE OPPOSITE."
2720 PRINT
2730 PRINT"THE PRIEST MAY ONLY CHANGE
GRAVES"
2740 PRINT"DURING THE DAY AND THE VAMP
IRE"
2750 PRINT"MAY ONLY CHANGE GRAVES DURI
NG"
2760 PRINT"THE NIGHT."
2770 PRINT
2780 PRINT"NIGHT IS INDICATED BY A  SH
ADED GREEN"
2790 PRINT"SKY WHEREAS DAY IS INDICATE
D BY A"
2800 PRINT"SHADED BLUE SKY."
2810 PRINT
2820 PRINT"GRAVES ARE CHANGED BY POSIT
IONING YOUR"
2830 PRINT"PLAYER OVER THE TOP AND PRE
SSING 'FIRE'"
2840 PRINT"ON THE JOYSTICK."
2850 PRINT
2860 PEN 2:PRINT"       PRESS SPACE TO
CONTINUE."
2870 IF INKEY$<>" " THEN GOTO 2870
2880 CLS
2890 PEN 2:LOCATE 15,2:PRINT"WARNING."
2900 PRINT
2910 PEN 3:PRINT"DURING HIS OWN PLAYIN
G PERIOD A"
2920 PRINT"PLAYER MAY CAPTURE HIS OPPO
NENT FOR"
2930 PRINT"AN IMMEDIATE VICTORY."
2940 PRINT
2950 PRINT"***************************
*************"
2960 PRINT
2970 PRINT:PRINT:PRINT"     INPUT SKILL
 LEVEL (1 TO 20)"
2980 PRINT"        1-HARD     20-EASY ";
2990 INPUT SK%
3000 IF SK%<1 OR SK%>20 THEN SOUND 1,5
0,10,7:GOTO 2990
3010 SK%=(SK%*100)
3020 PRINT:PEN 2:PRINT"       PRESS SPA
CE BAR TO PLAY."
3030 IF INKEY$<>" " THEN 3030
3040 MODE 0
3050 RETURN
3060 FOR i%=1 TO 23:LOCATE 1,1:PRINT C
HR$(8):NEXT
3070 FOR i%=1 TO 23:LOCATE 1,26:PRINT
CHR$(11):NEXT
3080 BORDER 0:SOUND 1,100,10,7
3090 FOR D%=1 TO 100:NEXT
3100 BORDER 26:SOUND 1,200,10,7
3110 FOR D%=1 TO 100:NEXT
3120 LOCATE 3,19:PEN 13:PRINT"press sp
ace to cont."
3130 RETURN
```

Busy bee

Tony Wye,
Hayes,
Middlesex.

Spectrum

THIS PROGRAM is called Busy Bee and runs on the Spectrum 16 and 48K. It's a maze type game where you have to cut the grass on a lawn avoiding the bees who are attracted to you because of the lawn mower noise.

Upon loading, the game auto runs and the instructions are displayed and the keys to be used — cursor keys — then P must be pressed to play. The screen is set up and you must move around the flower beds and cut the grass avoiding the bees who are moving about. When all the grass is cut you leave the screen via the bottom and then your bonus is added according to the time you took to clear the grass. Then you go on to the differently shaped screen 2.

This carries on with the screens 1 and 2 in turn and each stage the bees are attracted more and more to you until it is nearly impossible to get away from them. By then all your lives will have been used up. When all three lives are used the game over sign will be displayed and tell you if it is a new high score.

The hex loader.

```
  10 DEF FN h(h$)=16*(CODE h$(1)
-48-(7 AND h$(1)>"9"))+CODE h$(2
)-48-(7 AND h$(2)>"9")
  20 INPUT "Start ";s
  30 INPUT "Finish ";f
  40 FOR n=s TO f STEP 8
  50 LET tot=0  PRINT n;": ";
  60 INPUT h$: PRINT h$;
  70 LET x=0
  80 FOR b=1 TO LEN h$ STEP 2
  90 LET z=FN h(h$): LET tot=tot
+z
 100 POKE n+x,z
 110 LET h$=h$(3 TO ): LET x=x+1
 120 NEXT b
 130 PRINT " = ";: INPUT t: PRIN
T t
 140 IF tot<>t THEN PRINT "input
 error - try again": GO TO 50
 150 NEXT n
 160 REM enter STOP to stop
```

(continued from previous page)

Program 1.

```
10 PAPER 0:BORDER 0:INK 6:
CLS
20 PRINT AT 10,7; FLASH 1;
"BUSY BEE IS LOADING"
30 LOAD ""CODE
40 PRINT USR 31495
9997 REM SAVE ROUTINE
9998 SAVE "BUSY BEE" LINE 10
9999 SAVE "BUSY CODE"CODE 29
625,4525
```

The hex dump.

```
29625: 00182424241800 = 192
29633: 0010301010103000 = 168
29641: 00182404081C00 = 148
29649: 00380430404030 = 180
29657: 00202020203C0000 = 204
29665: 003C203040403000 = 212
29673: 00182038242418 00 = 208
29681: 003C040801010000 = 112
29689: 00182418242418 00 = 180
29697: 00182424103040 00 = 132
29705: 1F444A8490A8 9001 = 922
29713: F806225125080501 = 551
29721: 8109159251225E68 = 569
29729: 01A0D0A0A0A4601F = 994
29737: FF0522502102810 = 480
29745: 40A4A0420520FF = 705
29753: 90A09205829 0A890 = 1177
29761: 41A54B0525121010 = 458
29769: 0814B0A0C4A0A040 = 342
29777: 3C7EFFE7E7FFFF7E3C = 1344
29785: 0000020000000000 = 146
29793: 0000010017F4141 = 260
29801: 0000FE0101F13D3D = 619
29809: 41417F0101010000 = 260
29817: 3D3DF101101FE0000 = 619
29825: 0000 7F0000BFBCBC = 902
29833: 0000000000FE02B2 = 898
29841: BCBC0F0000 7F0000 = 902
29849: 02B2FE0000000000 = 898
29857: 0000 7040404040 3E4 = 1000
29865: 00E0202020202000FC = 636
29873: 2424272723201F = 283
29881: 2424E4E4C4C404F8 = 1172
29889: 1F2023232727 2424 = 283
29897: F804C4C4E4E4 2424 = 1172
29905: 3F0404040404040700 = 98
29913: FC2020202020E0000 = 636
29921: 1C1C083E49041A = 247
29929: 040A110206041 53A = 122
29937: 2050B0404020A050 = 700
29945: 393F1C0F00070201 = 181
29953: 9CFC38F01E04000 = 1000
29961: 0000210050801 02 = 348
29969: 113F751AFE442605 = 590
29977: 3E3277180330E7 = 471
29985: 2313 0B78FE0020EB = 706
29993: 79FE0020E6C9000 1 = 839
30001: E4021120708CD3C20 = 696
30009: 18D0061600004242 = 392
30017: 4242424242424242 = 528
30025: 4242424242424242 = 528
30033: 4242424242424242 = 528
30041: 4242424242423F = 525
30049: 3F3F3F3F3F3F3F3F = 504
30057: 3F3F3F3F3F3F3F3F = 504
30065: 3F3F3F3F3F3F3F3F = 504
30073: 3F3F3F3F3F4214 = 514
30081: 4444444444444444 = 544
30089: 4444444444444444 = 544
30097: 4444444444444444 = 544
30105: 4444444444404144 = 537
30113: 4444444444444444 = 544
30121: 4444444444444444 = 544
30129: 4444444444444444 = 544
30137: 4444444444404144 = 537
30145: 443A3E3E3E3E3B44 = 501
30153: 443A3B44443A3B44 = 506
30161: 443A3B44443A3E3E = 503
30169: 3E3E3B44440144 = 516
30177: 4440423F3F3F3C44 = 519
30185: 443D3C44443D3C44 = 514
30193: 443D3C44443D3F3F = 512
30201: 3F4241444440144 = 527
30209: 4440144444444444 = 537
30217: 4444444444404144 = 537
30225: 4444444444444444 = 544
30233: 4440144444404144 = 530
30241: 443D3C44444444444 = 529
30249: 4444444444444444 = 544
30257: 4444444444444444 = 544
30265: 443D3C44444444444 = 522
30273: 4444444443A3B44 = 525
30281: 443A3E3E3B44443A = 503
30289: 3E3E3B44443A3B44 = 504
30297: 4444444444404144 = 537
30305: 4444444444404144 = 537
30313: 443D3F3F3C44443D = 512
30321: 3F3F3C44444404144 = 519
30329: 4444444444404144 = 537
30337: 443A3B44440144 = 518
30345: 4444444444444444 = 544
30353: 4444444444404144 = 537
30361: 443A3B44440144 = 518
30369: 4440414444404144 = 530
30377: 4444444444404144 = 544
30385: 4444444444404144 = 537
30393: 4440414444404144 = 530
30401: 4444444444443C44 = 522
30409: 443A3E3B44443A = 503
30417: 3E3E3B44443D3C44 = 508
30425: 4440414444404144 = 530
30433: 443D3C44444444444 = 529
30441: 4440424241444440 = 529
30449: 4242414444444444 = 537
30457: 443D3C44444404144 = 522
30465: 4444444444444444 = 544
30473: 4440424241444440 = 529
30481: 4242414444444444 = 537
30489: 4444444444404144 = 537
30497: 4444444443A3B44 = 525
30505: 443D3F3F3C44443D = 512
30513: 3F3F3C4443A3B44 = 507
30521: 4444444444404144 = 537
30529: 4444444444404144 = 537
30537: 4444444444444444 = 544
30545: 4444444444404144 = 537
30553: 443A3B44440144 = 518
30561: 4440414444404144 = 530
30569: 4444444444404144 = 537
30577: 4444444444404144 = 537
30585: 4440414444404144 = 530
30593: 4440414444443E = 525
30601: 3E3E3E3B44443A = 501
30609: 3E3E3E3B44443E = 509
30617: 4440414444404144 = 530
30625: 443D3C44443D3F3F = 512
30633: 3F3F3F3F3C4443D = 509
30641: 3F3F3F3F3F3C44 = 506
30649: 4444444444404144 = 537
30657: 4444444444444444 = 544
30665: 4444444444444444 = 544
30673: 4444444444444444 = 544
30681: 4444444444404144 = 537
30689: 4444444444404144 = 537
30697: 4444444444444444 = 544
30705: 4444444444444444 = 544
30713: 4444444444443E = 525
30721: 3E3E3E3E3E3E3E3E = 496
30729: 443A3B44443A = 501
30737: 3E3E3E3E3E3E3E3E = 496
30745: 3E3E3E3E3E42000 6 = 382
30753: 1600004242424242 = 352
30761: 4242424242424242 = 528
30769: 4242424242424242 = 528
30777: 4242424242424242 = 528
30785: 4242424223F3F3F3F = 516
30793: 3F3F3F3F3F3F3F3F = 504
30801: 3F3F3F3F3F3F3F3F = 504
30809: 3F3F3F3F3F3F3F3F = 504
30817: 3F3F4241444444 = 529
30825: 4444444444444444 = 544
30833: 4444444444444444 = 544
30841: 4444444444444444 = 544
30849: 4444444444444444 = 537
30857: 4444444444444444 = 544
30865: 4444444444444444 = 544
30873: 4444444444444444 = 544
30881: 4444041444443A3B = 518
30889: 4444041444443A3E = 509
30897: 3E3B44443A3B44443A3B = 506
30905: 4444443B44443A3B = 506
30913: 4444041444443D3C = 522
30921: 4444041444443D3E = 509
30929: 4444041444443D3F3C = 526
30937: 4444041444444444 = 537
30945: 4444041444444444 = 537
30953: 4444041444444444 = 537
30961: 4444444444444444 = 544
30969: 4444041444444444 = 537
30977: 4444041444444444 = 537
30985: 4444041444444444 = 537
30993: 4444444444444444 = 544
31001: 4444041444444444 = 537
31009: 4444041444444444 = 537
31017: 4444041423E3B44444 = 523
31025: 3A3E3E3E3E3B44444 = 501
31033: 3A3E42414444443B = 504
31041: 4444041444444041 = 530
31049: 4444041444404144 = 537
31057: 3D3F42423F3C44444 = 519
31065: 3D3F3F3C44444041 = 512
31073: 4444041444444041 = 530
31081: 4444444444444444 = 544
31089: 4444041444444444 = 537
31097: 4444444444444444 = 544
31105: 4444041444443D3C = 522
31113: 4444444444444444 = 544
31121: 4444041444444444 = 537
31129: 4444041444443D3C = 529
31137: 4444041444444444 = 537
31145: 4444443E3E3E3E3B = 501
31153: 4444443D3C4443A3E = 513
31161: 3E3E3E3B44444444 = 517
31169: 4444444444404144 = 537
31177: 4444443D3F3F42414 = 517
31185: 4444444444404042 = 538
31193: 3F3F3F3C44444444 = 521
31201: 4444041444443A3B = 518
31209: 4444444444444041 = 537
31217: 4444444444444041 = 537
31225: 4444444444443A3B = 525
31233: 4444041444444041 = 530
31241: 4444444444443D3C = 529
31249: 4444443A3B44443D3C = 510
31257: 4444444444444041 = 537
31265: 4444404144444041 = 530
31273: 4444443B44444444 = 525
31281: 4444404144444041 = 530
31289: 4444443B44444041 = 518
31297: 4444404144444041 = 530
31305: 4444404144444444 = 537
31313: 4444404144444444 = 537
31321: 4444404144444041 = 530
31329: 4444404144444444 = 537
31337: 4444404223E3E3E3B = 511
31345: 4444404144444 3E = 521
31353: 3E3E42414444041 = 520
31361: 4444404144444041 = 530
31369: 4444D3F3F3F3F3C = 509
31377: 4444D3C4444D3F = 517
31385: 3F3F3C4444D3C = 506
31393: 4444404144444444 = 537
31401: 4444404444444444 = 544
31409: 4444444444444444 = 544
31417: 4444444444444444 = 544
31425: 4444404144444444 = 537
31433: 4444444444444444 = 544
31441: 4444444444444444 = 544
31449: 4444404144444444 = 537
31457: 4444042 3E3E3E3E = 514
31465: 3E3E3E3E3E3E3E3E = 496
31473: 3E3B44443A3E3E3E = 501
31481: 3E3E3E3E3E3E3E3E = 496
31489: 3E3E4444444444 = 525
31497: 4001001816007223 = 260
31505: 0B7B8120F9210050 = 710
31513: 0100031622722308 = 224
31521: 7B8120F93E202248 = 794
31529: 5D1C0F0C0F0C1C0D = 671
31537: 3C20ED4B6985CD1B = 874
31545: 1A3ADF00DBE1F38 = 867
31553: F8C3E87C3E87C16 = 1372
31561: 0100010001 0061000 = 97
31569: 4275737920426565 = 719
31577: 1602002040D6F7665 = 463
31585: 2079 6F752206C61 = 732
31593: 776E206D6F776572 = 815
31601: 206172617754E6E20 = 713
31609: 7 6E206D3737420 = 655
31617: 616C6C2074 6E620 = 698
31625: 6772617373206173 = 788
31633: 2071756963 6B6C79 = 802
31641: 206173207 06F7373 = 729
31649: 6C6C6C6C6C6C6C6C = 705
31657: 6765742061202 62F = 690
31665: 6E75732E20202020 = 516
31673: 2020202075 6B656E = 530
31681: 206 16C6C20746865 = 698
31689: 206 77 6C6 73732206F = 713
31697: 732063757420 6C65 = 720
31705: 6176652074 6B6520 = 701
31713: 736372656 56E2076 = 790
31721: 696120746 B652062 = 685
31729: 6F747 4A6F6D206578 = 816
31737: 69742E168000204 2 = 395
31745: 757420747 6F2062 = 741
31753: 656573206 8617665 = 769
31761: 206D6973746 1B65 = 782
31769: 206 2E206 2E206 2E20 = 423
31777: 6F752066 6F722061 = 716
31785: 207175656 56E2062 = 704
31793: 656361757365206F = 773
31801: 6620746 8652020 65 = 620
31809: 206 76 72206 5206 6F = 782
31817: 697365206 616E7920 = 725
31825: 636F6E746 1637420 = 790
31833: 7769746 8202020 274 = 656
31841: 686520265652 0 6D = 678
31849: 656 16E6F 2207275 = 684
31857: 206172652073747 5 = 724
31865: 6E72E596F752063 = 707
31873: 616E206F6 5E6C7920 = 721
31881: 7769746 8737461E = 882
31889: 6 4206 2746 8725620 = 750
31897: 7374696E677316E = 700
31905: 0355736 5206437572 = 634
31913: 736F722206B657973 = 816
31921: 20203520362C32 6C = 366
31929: 6291611 06 4B967 = 684
31937: 6020353 6F726520 = 676
31945: 3A20202020202016 = 272
31953: 1406505245535520 = 455
31961: 2750272054 4F2050 = 465
31969: 4C4 59720161133E = 396
31977: 3932365C3E722237 = 534
31985: 5C3E03326F853E00 = 513
31993: 326B8532 6C853E20 = 675
32001: 320F5C3E14324D7E = 628
32009: 5C3E03326F853E00 = 658
32017: 224 67E3E31326B85 = 632
32025: 181B C505E52A517D = 903
32033: 545D29291929292 9 = 407
32041: 1922317DE11D1C1C9 = 1061
32049: 4D49A020BF2A1 = 481
32057: 326DB5326E85ED43 = 889
32065: 66B156011E4ED53 = 628
32073: 5382161D1E14ED53 = 634
32081: 5102ED5322B51CED = 963
32089: 5329B5 5E01324FB2 = 579
32097: 3C3250023E20322BD = 605
32105: 5C3E01326B5C3A6B = 566
32113: 85CB472014 3E2032 = 603
32121: 3475 3E4232127 53E = 514
32129: 7032357532137518 = 550
32137: 12373E32347 53E3D = 403
32145: 3212753E7532357 5 = 584
32153: 32 1375CD5075 3E00 = 620
32161: 326B5C180F0652C5 = 541
32169: C5060010FEC1110F8 = 930
32177: C110F4C93E003236 = 820
32185: 5C3E3C32375C0118 = 436
32193: 0010327ECDD3C2E = 504
32201: 16D75E00D73E1CD7 = 919
32209: 3E4CD73A6885D73E = 925
32217: 392365C3E723237 = 534
32225: 5C111A7E0103003A = 323
32233: 6F85D03F5E0020FA = 844
32241: CD3C2000110291 12 = 389
32249: 7ECD3C20CDA67D18 = 943
32257: 4A160000353633A16 = 358
32265: 00124C9976657 33A = 591
32273: 16000826F6E7573 = 549
32281: 5A5C4D1B5C5E5 5A4 = 464
32289: 1614 1D150565716 = 288
32297: 140115015657161 5 = 259
32305: 0158591501161 51D = 272
32313: 5859150016020F4D = 314
32321: 4E1E03DF4F3D60D = 979
32329: 1FE8033EEFDBFE1F = 1071
32337: D2DB7E3A4F82FE02 = 1078
32345: CA5582061 4C506FF = 901
32353: 10FEC110F03A7005 = 1030
32361: FE00285353 5F2C2 = 752
32369: 00D73E0FD73E20D7 = 816
32377: 3E20D73E16D73E00 = 670
32385: D73E0ED72A4A7E7C = 872
32393: FE0020057DFE0028 = 710
32401: 1220224A7E5C1CD = 922
32409: 1B1A3E16D73E00D7 = 629
32417: 3E1ED73EEFDBFE1F = 1112
32425: 1F1FD2AE7F1FD2AF = 989
32433: B11FD2BEB03EF7DB = 1168
32441: FEC10CACA2D6C37C = 1181
32449: 7F3E003270B5CD3C = 749
32457: B53A6F05CDA67D3D = 992
32465: FE0020063E2F85C3 = 789
32473: 37D0110001 2D7F = 382
32481: 3E003236 5C3E0 2 = 440
32489: 375CCD3C2002A6B85 = 726
32497: ED4B69857CB8302A = 956
32505: 20047DB93242A6B = 587
32513: 8522A985110 7F01 = 566
32521: 1300CD3C2001B1 34 = 506
32529: 0C0912014E657720 = 370
32537: 4B9676B02053636F = 709
32545: 7265CDA67DCDA67D = 1207
32553: C3077BC9160102 04 = 604
32561: 1A0B4B7A16D6C2 4 = 453
32569: 4F7665723E16D73E = 773
32577: 00D73E03D72A6B85 = 777
32585: ED4B6D85A7285FE = 1113
32593: 0020223303347385 = 386
32601: FE0028002D3E3B00 = 466
32609: 3272853273852 2B = 736
32617: 85ED436D85E5C1CD = 1206
32625: 1B1A3E16D73E00D7 = 629
32633: 3E1ED73A7D05FE00 = 864
32641: C2C7ECD2C2D5353 4 = 1073
32649: 85FE00CA5582154 = 921
32657: 0111010 0E5D5CDB5 = 847
32665: 03D1E1011400ED42 = 761
32673: 7CFE0020EF3E0032 = 761
32681: 7185C5D5CD2ED4B6a = 1070
32689: 85D0CCCD2782FE28 = 825
32697: D27C7F04CD2782FE = 1093
32705: 2830B8CD3982FE0A = 928
32713: DACF7F32700 5FE02 = 1103
32721: 2005FE01327285D5 = 402
32729: CD3982FE0A380332 = 615
32737: 7005FE02005 3E01 = 601
32745: 32738500D7B3215 = 515
32753: 003C321B007921 6 = 586
32761: 8021C0D0A0A0A0A0 = 752
32769: 85111300010D00CD = 616
32777: 3C203E0132185C3 = 646
32785: 3D7F0160A0A0245 = 337
32793: 46160D0A20474 8E5 = 425
32801: 4B6685D0CD2782FE = 951
32809: 28D27C7F04CD2782 = 879
32817: FE28D27C7FCD3982 = 1147
32825: FE0A380332085FE = 872
32833: 02200S5E13272B5 = 399
32841: 85CD3982FE0A380 = 728
32849: 32705FE02200 5E = 650
32857: 013273B57B32B380 = 728
32865: 3C32B980793284B0 = 806
32873: 32B0BED4A36B511 = 872
32881: 0D0010D0C0CD2C2 = 568
32889: 3E013273 5C33D7F = 742
32897: 0616A0A0A494A016 = 249
32905: 0B0C4B4C20ED4B6e = 620
32913: 8504047BFE1 6C29 = 788
32921: 6179FE0022791 2A = 481
32929: 6D857DFE98C27C7F = 1218
32937: 7CFE01C27C7FCD57 = 1116
32945: 85CD5785 2AA7E7C = 924
32953: FE0020057DFE0028 = 710
32961: 4A2822A7E3E1E7 = 650
32969: 3E00D73E0FD73E20 = 663
32977: D73E2D73E16D73E = 885
32985: 00D73E0ED7E5C1CD = 1133
32993: 1B1A2A6B85322 6B = 511
```

SOFTWARE File

```
33001: 853E1e0736D073E = 771
33009: 03D7E5C1CD1B1A11 = 915
33017: 01002180040CD0503 = 603
33025: 11010021E803CDB5 = 672
33033: 0318A93A8E82C620 = 756
33041: 3816328E02CDA67D = 896
33049: 3A6805C32A8B521 = 675
33057: EE02224A7EC3337D = 845
33065: 3A4D7ED605324D7E = 733
33073: 3E3232B02C3337D = 805
33081: CD2782FE28D27C7F = 1129
33089: 0CCD2782FE28D27C = 1014
33097: 7FCD3982FE0A3003 = 842
33105: 327085FE022005 = 650
33113: 01327285D0CD3982 = 703
33121: FE0A3003327085FE = 872
33129: 022005301327285 = 400
33137: 05057932A28132A7 = 689
33145: 8132A8178043A1 = 815
33153: 813C32A6813C32AB = 815
33161: 01ED436605119F01 = 973
33169: 01000CD3C203E0 = 377
33177: 327185C33D7F0616 = 707
33185: 00A020160A00A4D = 203
33193: 4E160A0A4F50ED4B = 591
33201: 66B05CD2782FE2B = 908
33209: D27C7F0CCD2782FE = 1101
33217: 28D27C7FCD3982FE = 1147
33225: 0A3003327085FE02 = 620
33233: 20035E013272850D = 410
33241: CD3982FE0A300332 = 765
33249: 7085FE022005E01 = 601
33257: 327385793218232 = 675
33265: 1F8232482703219 = 572
33273: 823C3218C3C3223 = 545
33281: 82ED436605111782 = 839
33289: 011000CD3C203E01 = 377
33297: 327185C3D7F0616 = 707
33305: 00A0515216A00A53 = 308
33313: 54160A0A020202600 = 228
33321: 6816005929292929 = 379
33329: 2919110056197EC9 = 523
33337: 7DE6A1BC4A0677D07 = 994
33345: 8787878716F1100 = 797
33353: 02197EC900000000 = 354
33361: 00000002A5182ED = 490
33369: 4B5302ED435182 = 837
33377: 5382C34F82475A90 = 689
33385: 02324F82782502 = 769
33393: 3A4D82473A4E8232 = 652
33401: 4D827832A4E823A51 = 724
33409: 82473A52824FCD1B = 782
33417: 7D3A327DFECB3027 = 899
33425: 3E0932A0B2CD1B7D = 685
33433: 3A327DFE803C3A = 741
33441: 6785B280ED25983 = 896
33449: C370843A66050920 = 957
33457: EEDACF82C3E083C1 = 1556
33465: 1D7D3A327DFE403B = 759
33473: 0DFE80DA5903FEC0 = 1279
33481: DAE883C370842A51 = 1143
33489: 820CD2762FE28D2 = 1021
33497: 4C7E3A4CD2782FE20 = 874
33505: D24C7ECD2782FE02 = 1060
33513: 2023FE1C281FFE11 = 699
33521: 281BFE382817FEB8 = 830
33529: 2813FE13280FFE0A = 779
33537: 280FFE1E2807FE3A = 694
33545: 2803327085CD39 = 605
33553: 82FE022823FE1C28 = 783
33561: 1FFE3821BFE1128 = 719
33569: 17FE082813FE1328 = 785
33577: 0FFE0A200FE1E28 = 782
33585: 07FE3A2803327085 = 657
33593: 3A4D82FE01CA4C7E = 924
33601: 3E03324D82CDF784 = 906
33609: 3A52823D32238532 = 599
33617: 2A05325282C31485 = 785
33625: 040470FE16CA4C7E = 808
33633: CD2782FE28D24C7E = 1000
33641: 0CCD2782FE28D24C = 966
33649: 7ECD3982FE022023 = 849
33657: FE1C281FFE3281B = 730
33665: FE112817FE802813 = 783
33673: FE13280FFE0A200B = 771
33681: FE1E2807FE3A2003 = 686
33689: 32708500CD3982FE = 954
33697: 022023FE1C281FFE = 684
33705: 3821BFE112817FE = 711
33713: 0823FE13280FFE = 777
33721: 0A200BFE1E2807FE = 774
33729: 3A2803327085A4D = 531
33737: 82FE02CA4C7E3E04 = 856
33745: 324D82CDF7843A51 = 980
33753: 823C32518232228 5 = 668
33761: 3C322985C314050C = 644
33769: 0CCD2782FE28D24C = 966
33777: 7E04CD2782FE28D2 = 1008
33785: 4C7ECD3982FE0228 = 890
33793: 23FE1C281FFE3828 = 738
33801: 1BFE112817FE0828 = 791
33809: 13FE13280FFE0A28 = 779
33817: 0BFE1E2807FE3A28 = 694
33825: 0332708505CD3982 = 695
33833: FE022823FE1C28F = 684
33841: FE3821BFE112817 = 711
33849: FE08213FE13200F = 777
33857: FE0A200BFE1E2807 = 774
33865: FE3A2803327085 3A = 700
33873: 4D82FE03CA4C7E3E = 930
33881: 01324D82CDF7843A = 900
33889: 52823C3252823223 = 619
33897: 85322A05C3140505 = 711
33905: CD2782FE28D24C7E = 1000
33913: 0CCD2782FE28D24C = 966
33921: 7ECD3982FE022023 = 849
33929: FE1C281FFE3821B = 730
33937: FE112817FE802813 = 783
33945: FE13280FFE0A200B = 771
33953: FE1E2807FE3A2003 = 686
33961: 32708500CD3982FE = 954
33969: 022023FE1C281FFE = 684
33977: 3821BFE112817FE = 711
33985: 0823FE13280FFE = 777
33993: 0A200BFE1E2807FE = 774
34001: 3A2803327085A4D = 531
34009: 82FE04CA4C7E3E02 = 856
34017: 324D82CDF7843A51 = 980
34025: 823D32518232228 5 = 669
34033: 3C322985181D3A51 = 476
34041: 823222853C322985 = 631
34049: 3A52823222853222A = 580
34057: 051120501 0FC00D = 536
34065: 3C20C911208501 12 = 494
34073: 00CD3C20C34C7E0A = 700
34081: 161201150158571 6 = 281
34089: 1318585916001E15 = 293
34097: 001101002 1E803CD = 491
34105: 8503C90610C53A48 = 734
34113: 5C0F0F0F1E00F3D3 = 621
34121: FEEE104310FE1C20 = 905
34129: F6FBC110EBC9614 = 1165
34137: 6069C51104000CDB5 = 805
34145: 03C110FAC900 = 657
```

```
5 GOTO1000
10 L=INT(RND(1)*3+5):REM NO. OF
MINES
20 P=INT(RND(1)*60+40):REM NO. O
F WORKERS
30 M=INT(RND(1)*50+10)*P:REM '*9
UNT OF MONEY
40 FP=INT(RND(1)*40+80):REM PRIC
E OF FOOD
50 CE=INT(RND(1)*40+80):REM ORE
PRODUCED/MINE
60 C=0:REM SETS ORE IN STORAGE T
O ZERO
70 S=1:REM SETS SATISFACTION FAC
TOR TO ZERO
80 Y=1:REM SETS YEARS TO ZERO
90 LP=INT(RND(1)*2000+2000):REM
BUYING/SELLING PRICE FOR MINES
100 CP=INT(RND(1)*12+7):REM SELL
ING PRICE FOR ORE.
110 REM CURRENT STATE AFFAIRS OF
 COLONY
120 PRINT"■"
130 PRINT"YEAR";Y
140 PRINT
150 PRINT"THERE ARE";P;"WORKERS
IN THE COLONY."
160 PRINT"YOU HAVE";L;"MINES,AND
 $";M
170 PRINT"SATISFACTION FACTOR IS
";S
180 PRINT
190 PRINT"YOUR MINES PRODUCED";C
E;"TONS EACH."
200 C=C+CE*L
210 PRINT"AMOUNT OF ORE IN STORE
 IS";C;"TONS"
220 PRINT
230 PRINT"■SELLING■"
240 PRINT"■■■
```

```
(continued from previous page)
930 GOTO2000
940 PRINT"NO MORE MINES....GAME
OVER."
950 GOTO2000
999 REM ROUTINE FOR TITLE
1000 PRINT"[illegible]"
1001 POKE53280,0:POKE53281,0:REM
 MAKE SCREEN BLACK
1002 J$="[illegible] MINERAL RIGHTS"
1003 FORH=1TO2
1010 FORH=0TO10
1015 FORHG=1TO100:NEXTHG:REM PAU
SE LOOP
1020 PRINTTAB(H);J$
1030 NEXTH
1035 PRINT"[illegible]"
1040 J$="[illegible]"
1050 NEXTH
1070 PRINT"[illegible] YOU ARE THE NEWLY
 ELECTED LEADER OF A"
1080 PRINT"[illegible] MINING COLONY ON TH
E PLANET [illegible]ASTRON.[illegible]"
1090 PRINT"[illegible] ALL DECISIONS CON
CERNING THE SALE"
1100 PRINT"[illegible] OF ORE TO INTERGALA
CTIC TRADERS,FOOD"
1110 PRINT"[illegible] PURCHASES AND BUYIN
G & SELLING OF"
1120 PRINT"[illegible] MINES ARE MADE BY Y
OU!"
1125 PRINT"[illegible] THERE MUST BE AT L
EAST 10 WORKERS/MINE"
1130 PRINT"[illegible]PRESS
ANY KEY[illegible]"
1140 PRINT"[illegible]
[illegible]"
1150 GETR$:IFR$=""THEN1150
1160 GOTO10
1999 REM 'GAME OVER' SEQUENCE
2000 PRINT"[illegible]GAME OVER[illegible]"
2010 PRINT"[illegible] YOU LASTED[illegible]";Y;"[illegible]Y
EARS"
2020 PRINT"[illegible]WOULD YOU LIKE TO
HAVE ANOTHER GAME?"
2030 PRINT"[illegible](Y/N)"
2040 GETR$
2050 IFR$="N"THENSTOP
2060 IFR$="Y"THENRUN10
2070 GOTO2040
READY.
```

BBC colours

R. Watson,
Athersley South,
Barnsley.

BBC

ON BBC MICROS with Basic II, the filling command Plot 77 is available and is also pretty well known. A lesser known relative of this command is Plot 76, which does not draw a line, but just makes the cursor movements, which may be read using OSword with A=&D.

When the command Plot 77,x,y is given, the graphics cursor travels left until the pixel at that position is a non-background pixel, i.e. a different colour to the origin. This co-ordinate is then noted, the cursor then scans right until a similar pixel is found, and a line is drawn between these two points.

When using Plot 76, similar cursor movements are made, but without any line been drawn between points. Therefore it is possible to use this command to create your own fill routine, as I have done.

A method of obtaining new colours on the BBC which has received a lot of publicity lately is pixel "Dithering". What that means is mixing two or more colours to form a pattern similar to a chess board, the idea being that from normal viewing distance a screenful of such a pattern, say with alternating red and yellow pixels, would look orange. This is what my program sets out to do.

The only things that may need explaining in the program are the OSword call, and the method of pixel dithering. The OSword call with A=&D is used to read the last two sets of graphic co-ordinates. First of all an area must be allocated somewhere for the routine to dump its data — I have used eight locations on the zero page. After the call, the information is laid out like this — as given in the Advanced User Guide.

```
XY + 0 previous x,low
     1 previous x,high
     2 previous y,low
     3 previous y,high
     4 current  x,low
     5 current  x,high
     6 current  y,low
     7 current  y,high
```

The pixels are dithered by using the Basic command Eor, and also swapping the colours — 0 and 1. What Eor does is give the opposite of 1 or 0, in fact reverses it, so 1 Eor 1 = 0, and 1 Eor 0 = 1.

The program therefore toggles between the colours as it moves across the screen by first using colour 0, then swapping to colour 1 for each alternate pixel.

The pizels are dithered up the screen by swapping the colours in a similar way to which numbers are swapped in a sorting routine.

How to use the routine.

First:
Set colour 0 by ?fc = desired colour number (0-15)
Set colour 1 by ?sc = desired colour number (0-15)
Second:
Call the procedure by PROCfill (x,y), where x is middle of shape, and y is base of shape + 4.
Do not attempt to fill in any shape which does not have a black background.

```
 10MODE 7
 20PRINT"DEMONSTRATION (Y/N) :":
 30REPEAT:K%=GET:UNTILK%=78ORK%=89
 40IFK%=78 CLS:END
 50ONERRORPROCexample:REPEAT UNTIL
   GET=32:MODE7:END
 60MODE2
 70VDU23;8202;0;0;0;
 80block=&70
 90fc=&80:sc=&81:dc=&82
100osword=&FFF1
110SC%=0:FC%=0
120FORAX%=0TO1200STEP80
130FORAY%=1000TO100STEP-80
140MOVEAX%,AY%:GCOL0,7
150PLOT1,64,0:PLOT1,0,-64
160PLOT1,-64,0:PLOT1,0,64
170FC%=FC%MOD16:SC%=SC%MOD16
180?fc=FC%:?sc=SC%
190PROCfill(AX%+16,AY%-60)
200FC%=FC%+1:NEXT:SC%=SC%+1:NEXT
210REPEAT UNTIL GET=32
220PROCexample
230END
330DEFPROCfill(AX%,AY%)
340F%=0
350A%=&D
360X%=block MOD 256
370Y%=block DIV 256
380REPEAT
390PLOT76,AX%,AY%
400CALL osword:REM read coordinates
410NX%=block?0+256*block?1
420EX%=block?4+256*block?5
430FOR S%=NX% TO EX% STEP 8
440GCOL 0,fc?F%:REM colour 0 or 1
450F%=F%EOR1:REM dither pixel colour
460PLOT69,S%,AY%
470NEXT
480REM swap colours
490?dc=?fc:?fc=?sc:?sc=?dc
500F%=0
510AY%=AY%+4
520UNTILPOINT(AX%,AY%)<>0
530ENDPROC
540REM ***************************
550:
560DEFPROCexample
570CLS
580GCOL0,7
590MOVE640,260:DRAW660,340
600DRAW660,640:DRAW640,700
610DRAW630,640:DRAW630,340
620DRAW640,260
630?fc=1:?sc=3
640PROCfill(640,280)
650GCOL0,7
660MOVE630,640:DRAW600,790
670MOVE660,640:DRAW690,790
680MOVE630,560:DRAW500,700
690DRAW400,600:DRAW500,460
700DRAW630,540
710MOVE660,560:DRAW790,700
720DRAW890,600:DRAW790,460
730DRAW660,540
740?fc=5:?sc=7
750PROCfill(500,464)
760PROCfill(790,464)
770GCOL0,7
780MOVE660,540:DRAW800,400
790DRAW740,340:DRAW660,340
800MOVE630,540:DRAW500,400
810DRAW550,340:DRAW630,340
820?fc=4:?sc=7
830PROCfill(616,344)
840PROCfill(660,344)
850PROCcirc(500,600,50)
860PROCcirc(800,600,50)
870?fc=5:?sc=4
880PROCfill(800,554)
890PROCfill(500,554)
900PROCcirc(500,600,20)
910PROCcirc(800,600,20)
920?fc=3:?sc=7
930PROCfill(500,584)
940PROCfill(800,584)
950REPEAT UNTIL GET=32:ENDPROC
960:
970DEFPROCcirc(X%,Y%,R%)
980GCOL0,0
990MOVEX%,Y%
1000FORN=0TO2*PI+.1STEP.1
1010MOVEX%,Y%
1020X=COSN*R%+X%:Y=SINN*R%+Y%
1030PLOT85,X,Y:NEXT
1040ENDPROC
```

Multiborder

Campbell Black and
Alasdair Hobbs,
Junpier Green,
Midlothian.

Spectrum

ENHANCE YOUR Spectrum screen displays with a multicoloured border. This machine-code routine can be called instead of using a Pause0. It can be customised by your program to give between two and six coloured borders.

Carefully type in and save the Basic loader — listing 1. Run the program. If you have entered it correctly, the code will have been poked into memory and you can save it.

Now type in and save the demonstration program — listing 2. Run the program. You should now see some examples of the routine's spectacular possibilities.

Using the routine in your own programs is straightforward. First

CLEAR 64999

The routine should then be loaded into memory. Your own program can then be load-

ed or entered. A few pokes are required before calling the routine. Poke 65089 with the number of colours required in the border. Poke 65081 with the number corresponding to the first colour, Poke 65082 with the number corresponding to the second colour, and so on.

Finally, call the routine with

RANDOMIZE USR 65000

The border will remain multicoloured until a key is pressed. The addresses are summarised in table 1.

Table 1.

Start address	65000
No. of Colours	65080 Poke with a number between 2 and 6
1st colour	65081 Starting here, poke the required
2nd colour	65082 number of addresses with a number
3rd colour	65083 in the range 0-7
4th colour	65084 0 = black 1 = blue 2- = red 3 = magenta 4- = green 5 = cyan
5th colour	65085 6 = yellow 7 = white
6th colour	65086

Examine the demonstration listing to see how all the above was achieved from within a Basic program.

If you are saving and loading from Microdrive, change the syntax of the relevent lines in listings 1 and 2.

Listing 3 is the routine in assembly language. You will find this useful if you have an assembler and wish to incorporate it into a larger machine code program. If you want to relocate the routine, simply change the Org address. Note that the routine will only run in the top 32K of memory. Num is the variable holding the number of colours, Col is for the actual colours.

```
  10 REM
  20 REM ++mult:border demo++
  30 REM
 100 CLEAR 64999
 110 LOAD "mborder"CODE
 120 LET a$="Pokes required for
this border "
 130 BORDER 7: INK 0: PAPER 7: C
LS
 140 LET s=65000
 200 FOR a=1 TO 2
 210 FOR n=2 TO 6
 220 CLS : PRINT TAB 10;"MULTIBO
RDER"
 230 PRINT ''a$
 240 POKE s+80,n
 250 PRINT '';CHR$ 244;s+80;CHR$
44;n
 260 PRINT
 270 LET c=n
 300 FOR b=1 TO c
 310 READ x
 320 POKE s+80+b,x
 330 PRINT CHR$ 244;s+80+b;CHR$
44;x
 340 NEXT b
 345 PRINT ''"PRESS A KEY"
 350 RANDOMIZE USR s
 360 NEXT n
 370 NEXT a
1000 DATA 1,2
1010 DATA 2,4,6
1020 DATA 2,3,4,5
1030 DATA 5,0,2,4,1
1040 DATA 6,5,4,3,2,1
1050 DATA 6,3
1060 DATA 5,5,4
1070 DATA 2,6,2,5
1080 DATA 6,6,1,1,1
1090 DATA 3,2,1,3,2,1
```

```
  10 REM ++mult:border loader++
  15 LET c=0
  20 FOR n=65000 TO 65086
  30 READ x
  40 POKE n,x
  45 LET c=c+x
  50 NEXT n
  60 IF c<>8507 THEN PRINT "ERRO
R IN DATA": STOP
  70 SAVE "mborder"CODE 65000,87
 100 DATA 58,56,254,95,214,1,71,
33,48,254,221,33,54,254,35,16,25
3,78,221,113,1,71,33,43
 110 DATA 254,35,16,253,126,221,
119,0,118,83,33,57,254,126,211,2
54,221,70,0,221,78,1,13,32,253,1
6,248,175,219,254
 120 DATA 47,230,31,192,35,21,32
,201,24,224,0,0,0,0,200,185,187,
188,191,9,6,1,3,2,0,0,0,0,0,0,0,
0,0
```

Sultan's Tower

Remko Blakenburgh,
Leiden,
Holland.

ZX-81

SULTAN'S TOWER is an original, fast-moving action game which consists for the most part of machine-code. The scene is laid in Arabia in the middle ages. Fatima, the girl-friend of the Arabian prince Achmed, has been kidnapped by the wicked Sultan of Bahrain and put in his harem. She is detained on the upper floor of a tower, which consists of 10 floors.

You play the part of Achmed, who would rather keep his girl for himself. You must save Fatima but, to do so, you must reach the ninth floor starting off from the ground level. Each floor is divided into six parts which lie above each other. You must start off from the bottom part and ascend using ladders and ropes.

At the left of the upper part there is a doorway leading to the floor above you. When you have reached the upper part of the ninth floor you must grasp Fatima and run back downward. You can use slides to move down quickly. To descend to a floor below you, you should use the doorway at the left of the lower part of the floors.

When you have reached the ground level, you can leave the tower by walking through the exit at the left of the lower part and have a happy life together with Fatima. Unfortunately, it's rather difficult to save girls from harems. On every floor, harem-guards are busy chasing you. You had better beware of them because you will be sentenced to imprisonment for life if they get you.

As you progress, more harem-guards will be employed by the ugly sultan to make life hard for you. Each time you reach another floor, two more guards will try to make an end of your freedom.

Sometimes the harem-guards fall into holes. In that case, a guard can't harm you very much but after some time he will climb down to the part below him using a rope. You can use this rope later to climb up or down.

Your time to complete your mission is limited. If you run out of time, a pretty big bomb at the bottom of the tower will explode, destroying the tower with you and your girl.

The keys used to control the game are:

I — up/jump
J — down
Y — right
T — left
O — hold

If you are not pleased with these key controls you can change them by poking:

16830, code of key for hold
16838, code of key up
16845, code of key down
16852, code of key left
16859, code of key right

You can abandon a game by pressing Shift on its own.

The machine-code is held in one large Rem-statement with line number zero. Before entering the machine-code, you must obtain this line. To do so, enter a line

1 REM

followed by 128 characters — that's four full lines. Then, edit this line and change the line number to 2. Continue this procedure until you have lines 1-11. Finally, enter a line

12 REM

followed by 77 characters.

You can check whether your lines have the correct length by entering:

PRINT PEEK 16396 ÷ 256 × PEEK 16397 — 16509

You should get the number 1557. If not, check your lines and correct them where necessary. Now enter as direct commands, in succession:

POKE 16510,0
POKE 16511,17
POKE 16512,6
POKE 16514,118
POKE 16515,118

You now have a massive Rem-statement of 1551 characters long with line number 0. Type in the hex-loader and enter the hex codes. I advise you to save the program at regular intervals in order to prevent you from losing all your work when a crash occurs.

After having entered the hex-codes, delete the hex-loader and type in the Basic program. Now save the program by entering:

RUN 9900

The way in which the program is saved may seem a bit cumbersome, but it is actually a means of reducing saving and loading time. It works like this: before saving, the system variable Ramtop is set to 0, whereby the display-file is reduced to its minimal size. Now the program is shortened for about 750 bytes, so loading time is considerably reduced. After saving, Ramtop will get back its previous value, 128, which causes the display-file to take its normal size.

I am aware of the fact that typing in machine-code programs can be rather tedious. Therefore, I will send you a tape version of my game if you send £3 to Remko Blakenburgh, Korenbloem 34, 2317 KX Leiden, Holland.

The hex loader.

```
  99 REM HEX LOADER
 100 PRINT "START ADDRESS"
 110 INPUT S
 120 PRINT "FINISH ADDRESS"
 130 INPUT F
 140 FOR N=S TO F STEP 8
 150 LET T=0
 160 PRINT N;" - ";
 170 INPUT A$
 180 PRINT A$;" = ";
 190 INPUT TOT
 200 PRINT TOT
 210 LET Z=0
 220 FOR K=1 TO LEN A$ STEP 2
 230 LET C=(CODE A$(K)-28)*16+CO
DE A$(K+1)-28
 240 LET T=T+C
 250 POKE N+Z,C
 260 LET Z=Z+1
 270 NEXT K
 280 IF TOT=T THEN GO TO 310
 290 PRINT "ERROR - PLEASE INPUT
AGAIN"
 300 GO TO 150
 310 NEXT N
```

(continued from previous page)

Program 1.

```
 100 POKE 46415,0
 120 CLS
 130 PRINT "*********************
**************  S U L T A N"'"S
T O W E R  ********************
**************"
 140 PRINT ,,,"CHARACTERS,"
 150 PRINT ,,,"X = YOU"'"▒ = YOU
R FATIMA"'"Y = FATIMA","8 = HAR
EM-GUARD"
 160 PRINT ,,,"K E Y S :"'"T=
EFT","Y=RIGHT","I=UP/JUMP","U=
DOWN",,,"0=HOLD","SHIFT=STOP GAM
E"
 200 PRINT ,,,"PLEASE CHOOSE GA
ME LEVEL (1-3)",,,"GAME LEVEL =
"
 210 LET K$=INKEY$
 230 IF K$="1" OR K$="3" THEN GO
TO 210
 240 PRINT AT 21,13;K$
 250 POKE 16527,17-2*VAL K$
 260 PRINT ,,,"  PRESS ANY KEY
TO PLAY"
 265 IF INKEY$<>"" THEN GOTO VAL
"265"
 270 IF INKEY$="" THEN GOTO VAL
"270"
 280 CLS
 290 RAND USR 16516
 295 CLEAR
 300 FOR D=0 TO 130
 310 NEXT D
 320 RUN
9900 FAST
9910 POKE 16389,0
9920 CLS
9930 SAVE "S▒"
9940 POKE 16389,128
9950 CLS
9960 SLOW
9970 RUN
```

The hex dump.

```
16514: 7676FD362105FD36  = 899
16522: 4800FD367CDCDDE8  = 955
16530: 40ED7346402A3440  = 708
16538: 223240CDF540CD92  = 1013
16546: 41CD6844CDB141CD  = 1189
16554: 224SCDE43ED5B7E   = 1058
16562: 40CD4B433A8640FE  = 825
16570: FE20E9ED7B464009  = 1814
16578: 0100FFFDFFF2100   = 1022
16586: 2B3134343700100   = 279
16594: 0000000000000000  = 0
16602: 0000000000000039  = 57
16610: 2B222A121E1C1C5C  = 334
16618: 2A0C4023111C440CD = 641
16626: DD43C92A0C401164  = 724
16634: 000E0560521936560 = 255
16642: 251DFB0D2DFS0ED4  = 1022
16650: CD77437EFE8020FE  = 1179
16658: 06041121003562D19 = 184
16666: 10FB0D20EB2A0C40  = 665
16674: 1164001920E0EB06  = 432
16682: 02CD5343E61F6F26  = 767
16690: 00197EFE8020F2E5  = 1036
16698: D511DFFF3D117EE21 = 1293
16706: A720E5368A10E2E1  = 895
16714: 840019E0D20D80E   = 667
16722: 05CD77432B2B2B05  = 531
16730: 057EFE8020F32310  = 839
16738: F82B2B0604112000  = 393
16746: 36181910FB0D20E1  = 640
16754: 2A0C40110700197E  = 293
16762: 11000119584FE20   = 827
16770: 2002363E11940219  = 342
16778: 36B6FE1C0036930 9 = 1112
16786: 210000223C402A0C  = 245
16794: 4011D7023A4640C8  = 695
16802: 472803113001922   = 257
16810: 3E407E32A40C9ED   = 868
16818: 4B2540793C2804CD  = 506
16826: 5D077EFE1CCCE443  = 1055
16834: 210000FE2E200321  = 401
16842: DFFFFE2F20032121  = 860
16850: 00FE3920003217FFF = 859
16858: FE3E2003210100E2  = 419
16866: 3C402A3E407EFE24  = 708
16874: CA6442112100193A  = 533
16882: 1040FE2E28FE2D    = 784
16890: 2817FA7280FFE18   = 659
16898: 200F3A3C40FE028   = 524
16906: 08FEFF2304ED533C  = 941
16914: 40FEA720142E7EFE  = 832
16922: 18200E3A4040FE18  = 534
16930: 2007112000ED533C  = 468
16938: 402A3E403A4040777 = 537
16946: 2E5B3C40197EFE76  = 975
16954: 2843FE302803FFE8A = 964
16962: 2835FE242803240   = 603
16970: 40223E4203E3D473A = 468
16978: 4340CB4F7E320236  = 531
16986: BDE52A3C40477CB5  = 960
16994: E1C378FEB42846FE  = 1348
17002: 5B6247FE5EFSCC30  = 1106
17010: 3FFEF9C3A4840     = 1095
17018: CB4F2063192A3E40  = 782
17026: 18CA0807110020385 = 342
17034: BDCD4B433E24D4B   = 905
17042: 4310F4063E1D0414  = 575
17050: CDA343CD4S4310F8  = 1406
17058: 11A84A0C3234439B  = 651
17066: 2B6247FE5EFSCC30  = 1119
17074: 347A21540CB86FE   = 934
17082: B4F5C037414F1FSC4 = 1434
17090: 5644A0C401107003  = 896
17098: 1934F12B0735521   = 704
17106: 4840C5C8211410034 = 719
17114: ED7B5440C3934011  = 917
17122: 0080CD4B43CD7A44  = 870
17130: 2A0C4011740119EE  = 906
17138: 111143CDDD43D506  = 813
17146: 0A11000FCD4B43CD  = 594
17154: B0431DF3D1E12BCD  = 1175
17162: FD4D0F54E4AC9C8   = 1033
17170: 3433320376393931  = 404
17178: 3B6938E3433783B2E = 460
17186: 3B3B3B3B3B3B3B3B  = 383
17194: 3235312A398A860E  = 577
17202: 110010363DCD4B43  = 495
17210: 36BECD4B4310F421  = 884
17218: 4040FBCBEF32404   = 923
17226: C9D5157A8320FED1  = 1234
17234: C9E5D52A32A0CBC5  = 1199
17242: 94SD29A2-9829229  = 407
17250: 3A0C40FE2A7E2B    = 962
17258: C5473A2840FFFE73  = 1056
17266: C1C0C3367ACD5343  = 1117
17274: CD8A43E5077ED5320 = 982
17282: 43E5F2000E2E5EFD  = 794
17290: 2929292929191164  = 347
17298: 0019ED5B0C4019CD  = 659
17306: 5343E1F1B00119    = 583
17314: 03E5FFED4F11100   = 1056
17322: 05CD4B433E1EED47  = 752
17330: D1C9FE2A0C401105  = 795
17338: 0019E1F1E5433CDD  = 980
17346: 43E5FB2E4023C6FD  = 794
17354: 3A2840322BFRCDDD  = 938
17362: 43F1C9203431519B0 = 888
17370: 0080C01A5677CBF7  = 1182
17378: 77331328F6C92A0C  = 714
17386: 40112000197EFE12  = 536
17394: CAFF433D77FE1BC0  = 1177
17402: 36B2E18F00E0206   = 420
17410: 1E3E1F90ED471100  = 592
17418: 04CD4B4310F30D20  = 655
17426: EE1118441180B3E34 = 496
17434: 3A0D2731A3C002E   = 294
17442: 79D5CD7R442A0C40  = 847
17450: 117501191DCDDD43  = 862
17458: ED7B4640C90816CS  = 920
17466: 2A0C4011180319E5  = 416
17474: 11DFFF19C101D502  = 946
17482: EDB811000SCD4B43  = 793
17490: C110E4C9D6170C52A = 905
17498: 0C4011181019E519  = 405
17506: D101D502EDB0EB06  = 1080
17514: 202335000IFB1100  = 405
17522: 08CD4B43C110DFC9  = 988
17530: 2A0C400E1000202   = 415
17538: 360010FB230D20F5  = 646
17546: D93A2140472R1040  = 549
17554: FE20C40CD6A43CD   = 930
17562: 5343CB3F5F16003A  = 591
17570: 2140B6280BC313CB  = 754
17578: 18CB130CB12197ER7 = 779
17586: 20DFE5112100197E  = 685
17594: E1FE8020D4EBE173  = 1426
17602: 2372233360233600  = 327
17610: 2356003E310C8C9E1 = 669
17618: 2A0C7E3F1D7E1E1   = 559
17626: 2356C94F3A4340E6  = 820
17634: FC47CD5343CB4776  = 1072
17642: 2802CBC7D4343479  = 746
17650: 2143434CE5EC5BCB6 = 1006
17658: AF32444079C9E53A  = 966
17666: 2140472R1040SEE3  = 419
17674: 5E2E3232323232    = 440
17682: ED52E1E3280510EE  = 1070
17690: C33C7A2B2B7EE1C9  = 1015
17698: 3R2140472R1040C5  = 545
17706: 1E1144140110S0EE  = 618
17714: B03A4340CB5F280C  = 715
17722: 2145403SC27D4621  = 641
17730: 4340CB9E3A4040A7  = 645
17738: 282BFE1E28220E1   = 440
17746: 783D4FCDD1442A41  = 849
17754: 40197ECBBFE3D79   = 1045
17762: 280410EC180R473A  = 459
17770: 4340EBFEC5B32440  = 970
17778: 3A4340EB03CDD144  = 904
17786: 2R4140197EFE8020  = 736
17794: 0A473A440FEB2T8   = 690
17802: C4DD44FEDECCDD44  = 1246
17810: FER4CCDD442A4140  = 1082
17818: 112100197EFE8A28  = 633
17826: 0EA7280FEE1320DF  = 557
17834: 3A4340CB57280B3A  = 585
17842: 4340F603243407E   = 687
17850: FE2D2043R4440FE   = 811
17858: 2D2B1D3A4340E603  = 536
17866: FE022005CDDD4418  = 811
17874: 0FCD5343CB472808  = 692
17882: 3A4340FB03324340  = 619
17890: 3R4440FE4340280A  = 763
17898: 4140112100197EFE  = 584
17906: 2D281F3A4340E603  = 538
17914: FE03E005CDDD4418  = 812
17922: 112C0E2B4472B0A   = 536
17930: 3A4340CB57CBCF32  = 987
17938: 43403A4440FE8A20  = 745
17946: 182A41036A4CEDE   = 489
17954: 324440FE4340CEDE  = 763
17962: CBDE3E1E3245401G  = 724
17970: 4R2A4140343444077 = 554
17978: 3A4340CB05EE5EDE  = 1065
17986: 44E1197EFE762811  = 873
17994: 473A4040FEB47S20  = 843
18002: 1247CBBFFE3D7B20  = 950
18010: 0R3A4340EB013243  = 555
18018: 4018CEFE24CC0045  = 857
18026: E5214340CB5E128   = 947
18034: 023E0E3244403E24  = 350
18042: 2214A0E1FE2114140 = 575
18050: 010S00EB0EBC105   = 852
18058: C22945C9C33C7A76  = 1000
18066: 00011900ER303400  = 360
```

Battle Tank

David Yip,
Carlisle,
Cumbria.

The AIM OF the game is to destroy the enemy tank. In order to do so, you must shoot away the blocks between you and your enemy first — the number of blocks varies. It sounds simple but the catch is that you can only fire a maximum of three shots and a minimum of one shot. You and the other tank will fire at the blocks alternately. The game can be played by one or two players.

One player: You play against the computer and you have five lives. Every time you destroy an enemy tank, you get one point and the computer's intelligence level increases.

```
10 REM    *** BATTLE TANK ***
20 TEXT:CLS
30 PAPER 0:INK7
40 REM  >> REDEFINE CHARACTERS <<
50 FOR X=46856 TO 46975
60 READ A
70 POKE X,A
80 NEXT X
90 DATA 0,1,3,1,15,31,10,7          'a
100 DATA 0,56,63,60,63,63,42,63     'b
110 DATA 0,0,62,0,0,48,32,0         'c
120 DATA 0,0,12,0,0,0,0,0           'd
130 DATA 30,30,30,30,30,30,30,30    'e
140 DATA 0,0,31,0,0,3,1,0           'f
150 DATA 0,7,63,15,63,63,13,63      'g
160 DATA 0,32,48,32,60,62,20,56     'h
170 DATA 0,0,0,0,0,12,18,18         'i
180 DATA 0,0,0,1,0,2,1,1            'j
190 DATA 0,0,30,12,51,33,30,12      'k
200 DATA 0,0,0,32,0,16,32,32        'l
210 DATA 1,4,1,10,5,34,15,8         'm
220 DATA 0,18,12,51,12,45,18,51     'n
230 DATA 32,8,32,2,40,17,44,8       'o
240 H=0
250 REM  >> TITLE <<
260 CLS
270 FOR X=CBBA8 TO ±BC97 STEP 40
280 POKE X,22
290 NEXT X
300 PRINT CHR$(4)
310 PRINT SPC(7) CHR$(27);"A";CHR$(27);
"JB A T T L E  T A N K"
320 PRINT CHR$(4)
330 PRINT SPC(12) CHR$(27);"B";CHR$(96)
;" DAVID YIP"
340 PRINT:PRINT:PRINT:PRINT
350 PRINT"HOW MANEY PLAYERS (1 OR 2) :"
:
360 GET A$
370 IF A$="1" THEN P=1:GOTO 400
380 IF A$="2" THEN P=2:GOTO 400
390 GOTO 360
400 PRINT A$
410 S=0:G=0
420 T(1)=5:T(2)=5
430 L=4
440 REM  >> SCREEN LAYOUT <<
450 FOR X=£BE28 TO £BEC7 STEP 40
460 POKE X,22
470 NEXT X
480 POKE £BD8,18
490 PLOT 15,14,"BLOCK ="
500 PLOT 8,17,0
```

(continued on page 110)

AN EXCLUSIVE OFFER TO BBC MICRO & CBM 64 OWNERS

APPROVED
for use with telecommunication systems run by British Telecommunications in accordance with the conditions in the instructions for use

FREE
SUBSCRIPTION TO PRESTEL & MICRONET

Purchase a Tandata complete communications package before 31st July, 1985,* and we'll give you a FREE subscription for 3 months to Prestel and Micronet.

You'll be able to enjoy up-to-the-minute news, comment, articles and reviews via Micronet 800 and Viewfax 258. Download computer programmes- many free of charge. Access all the other Prestel public databases. Communicate with other micros. And even carry out electronic messaging and mailing.

Tandata complete communication packages include a smart auto-dial modem and matching micropack with the appropriate software, cable and manual. In short, everything you need to convert your micro into a powerful Viewdata terminal.

TANDATA SMART AUTO-DIAL MODEMS

Features: Multi-baud rate (V21/V23); Auto-dial; Auto-recall; Auto log-on; Storage of up to 8 telephone numbers and IDs/passwords.

MICROPACKS

Contain software in ROM, disk or cassette for the BBC and in ROM cartridge for the CBM 64. Depending upon the micropack, features include: Full Prestel colour emulation; Prestel or message editor; Save to disk or cassette; File transmit; Telesoftware downloader; Print.

To take advantage of this limited offer, complete and return the coupon. We'll send full information and an application form.

OTHER MICRO OWNERS

Tandata smart auto-dial modems and Prestel/Communications software are available for many other micros, including: IBM PC, Columbia, Olivetti M24, Apricot, Superbrain II, Philips P2000c, Research Machines 380Z, Apple IIe & IIc, VIC 20 etc. All offer many advanced features and represent superb value for money. For further details complete the coupon.

Name_____
Address_____

Micro make/model_____

Send to: Tandata Marketing Limited, Albert Road North, Malvern, Worcs WR14 2TL.

Free subscription offer applies to BBC Micro and CBM 64 owners only.

YC6

Tandata

Tandata Marketing Limited,
Albert Road North, Malvern, Worcs. WR14 2TL
Telephone: 06845 68421

* Subject to availability.

Prestel is a registered trade mark of British Telecommunications plc. Micronet 800 is the trading style of Telemap Ltd. and British Telecommunications plc.

(continued from page 108)

```
 510 PLOT 6,17,"PLAYER 1                    SCO
RE"
 520 PLOT 1,18,3
 530 PLOT 20,18,P-1
 540 PLOT 2,18,"abc abc abc abc"
 550 PLOT 29,18,"0"
 560 IF P=1 THEN 590
 570 PLOT 23,18,"fgh fgh fgh fgh"
 580 PLOT 27,17,"PLAYER 2"
 590 POKE £268,7:PRINT
 600 IF P=2 THEN PRINT:GOTO 620
 610 PRINT SPC(11) CHR$(27);"AHI SCORE =
";H
 620 PRINT"
"
 630 PRINT:PRINT:PRINT
 650 REM  >> BLOCKS <<
 660 PLOT 2,12,"
    "
 665 PLOT 1,12,3
 670 PLOT 2,12,"abc"
 680 PLOT 32,12,"fgh"
 690 FOR X=6 TO 31
 700 PLOT X,12,1
 710 NEXT X
 720 BL=INT(RND(1)*9)+17
 730 X=INT((27-BL)/2)
 740 PLOT 4+X,12,4
 750 FOR Y=5+X TO 4+BL+X
 760 PLOT Y,12,"e"
 770 NEXT Y
 780 PLOT 22,14,STR$(BL)
 790 PLOT 22,14,7:G=G+1
 800 REM  >> GAME BEGINS <<
 810 IF G/2=INT(G/2) THEN 1120
 820 POKE £268,21:PRINT
 830 PRINT"PLAYER 1":PRINT
 835 PLOT 24,23,"    "
 840 PRINT" HOW MANY SHOTS (1-3) :";
 845 A$=KEY$+KEY$+KEY$
 850 GET A$:A=VAL(A$)
 860 IF A>3 OR A<1 THEN 845
 870 PRINT A$
 880 A=A-1:X=5
 885 GOTO 930
 890 PLOT X,12,1
 900 X=X+1
 910 IF SCRN(X,12)=101 THEN 950
 920 IF SCRN(X,12)=102 THEN 1010
 930 PLOT X,12,"d"
 940 GOTO 890
 950 SHOOT:BL=BL-1
 960 PLOT X,12,4
 965 PLOT 23,14,"  "
 970 PLOT 22,14,STR$(BL)
 980 PLOT 22,14,7
 990*IF A=0 THEN 1120
 995 WAIT 20
 1000 GOTO 880
 1010 GOSUB 1520
 1020 IF P=2 THEN 1080
 1030 S=S+1
 1040 PLOT 28,18,STR$(S)
 1050 PLOT 28,18,0
 1060 L=L+1
 1070 GOTO 650
 1080 T(2)=T(2)-1
 1090 PLOT T(2)*4+19,18,"    "
 1100 IF T(2)>0 THEN 650
 1110 W=1:GOTO 1660
 1120 POKE £268,21:PRINT
 1130 IF P=1 THEN 1210
 1140 REM  >> PLAYER 2<<
 1150 PRINT"PLAYER 2":PRINT
 1160 PLOT 24,23,"    "
 1170 PRINT" HOW MANY SHOTS (1-3) :";
 1175 A$=KEY$+KEY$+KEY$
 1180 GET A$: A=VAL(A$)
 1190 IF A>3 OR A<1 THEN 1175
 1200 PRINT A$:GOTO 1290
 1210 REM  >> COMPUTER <<
 1220 PRINT" ORIC :   ":PRINT
 1230 A=INT(RND(1)*3)+1
 1240 IF BL>L THEN 1280
 1250 IF (BL+1)/4=INT(BL/4)+1 THEN 1280
 1260 A=((BL+1)/4-INT(BL/4))*4
 1280 PRINT"I FIRE ";A;"SHOTS
"
 1285 WAIT 50
 1290 A=A-1:X=31
 1300 GOTO 1350
 1310 PLOT X,12,1
 1320 X=X-1
 1330 IF SCRN(X,12)=101 THEN 1370
 1340 IF SCRN(X,12)=99 THEN 1420
 1350 PLOT  X,12,"d"
 1360 GOTO 1310
 1370 SHOOT:BL=BL-1
 1375 PLOT X,12,4
 1376 PLOT 23,14,"  "
 1380 PLOT 22,14,STR$(BL)
 1390 PLOT 22,14,7
 1400 IF A=0 THEN 820
 1405 WAIT 20
 1410 GOTO 1290
 1420 GOSUB 1500
 1430 T(1)=T(1)-1
 1435 IF T(1)=0 THEN 1460
 1440 PLOT T(1)*4-2,18,"    "
 1450 GOTO 650
 1460 W=2
 1470 IF P=2 THEN 1660
 1480 GOTO 1600
 1490 REM  >> HIT <<
 1500 X=2:PLOT 1,12,1
 1510 GOTO 1530
 1520 X=32
 1530 PLOT X,12," i "
 1540 EXPLODE
 1545 WAIT 30
 1550 PLOT X,12,"jkl"
 1560 EXPLODE
 1565 WAIT 50
 1570 PLOT X,12,"mno"
 1580 WAIT 300:RETURN
 1590 REM  >> GAME OVER <<
 1600 PLOT 1,9,1:PLOT 1,10,1
 1610 PLOT 2,9,14:PLOT 2,10,14
 1620 PLOT 11,9,"G A M E  O V E R"
 1630 PLOT 11,10,"G A M E  O V E R"
 1640 IF S>H THEN H=S
 1650 WAIT 1000:GOTO 250
 1660 POKE £268,21:PRINT
 1665 PRINT"WELL DONE PLAYER ";W:PRINT
 1670 PRINT"YOU HAVE WON BY ";T(W);"TANK
(S)"
 1680 WAIT 1000:GOTO 250
```

Header reader

H.V. Smith,
Brecon,
Powys.

Amstrad

I HAVE WRITTEN a program similar to ones published previously for other computers e.g. the ZX Spectrum or the Amstrad CPC-464. It is a program written in Basic with a short accompanying Z-80 machine-code routine which reads the header at the beginning of a file on tape and interprets this to give the user the information recorded there, which is normally inaccessible to the user.

On running, the program first returns the screen display to its default conditions as at startup when switching on. This is achieved by the two calls to the firmware jumpblock: Call &BBFF and Call &BB4E. Using these two simple calls avoids having to reset all the seperate aspects of the screen display i.e. the Mode, Pen, Paper, Ink settings etc. These two calls are in fact quite useful in any program at the beginning to make sure that the effect of printing on the screen can be entirely predictable.

It then calls the subroutine at line 230 and onwards which simply pokes in the short machine code routine at 41000 onwards. It also lowers Himem to 39999 to give space for the routine and for the storage of the data obtained from the header, the amount of space allocated being in fact more than adequate, though this fact is unlikely to mean that there is unsufficient memory left for use by any program residing in memory, mainly because it is unlikely that any program other than the header reader would be in the memory.

The program then calls the machine code routine which starts the tape and searches for the header at the beginning of a file. Since the routine uses quite a low level Rom routine

```
 10 REM ********************************
 20 REM **  (c) Howard V. Smith 1985  **
 30 REM ********************************
 40 CALL &BBFF:CALL &BB4E
 50 GOSUB 230
 60 POKE 40030,0:CALL 41000:IF PEEK(40030)=253 THEN PRI
NT"ESCape pressed...":PRINT:GOTO 210 ELSE IF PEEK(4003
0)<>0 THEN PRINT"Tape Er
ror":PRINT:GOTO 210
 70 PRINT SPACE$(7);"Tape Header Reader :":PRINT CHR$(2
2);CHR$(1);CHR$(11);SPACE$(7);STRING$(18,"_");CHR$(22)
;CHR$(0)
 80 PRINT:PRINT:PRINT"Filename : ";:t=0:FOR a=40000 TO
40015:PRINT CHR$(PEEK(a));:t=t+PEEK(a):NEXT:IF t=0 THE
N PRINT"Unnamed File";
 90 PRINT:PRINT:PRINT"Block Number :";PEEK(40016)
 100 PRINT:PRINT"Last Block ? : ";:IF PEEK(40017)=0 THE
N PRINT"No."ELSE PRINT"Yes."
 110 PRINT:PRINT"File Type : ";:a=PEEK(40018)
 120 a$=BIN$(a,8)
 130 t=VAL(MID$(a$,5,3)):IF t=0 THEN PRINT"BASIC Progra
m"ELSE IF t=1 THEN PRINT"Binary File"ELSE IF t=2 THEN
PRINT"Screen Image"ELSE
IF t=3 THEN PRINT"ASCII File"ELSE PRINT"Unknown."
 140 PRINT:PRINT"Protected ? : ";:IF VAL(RIGHT$(a$,1))=
1 THEN PRINT"Yes."ELSE PRINT"No."
 150 PRINT:PRINT"Length Of Data In Block :";PEEK(40019)
+256*PEEK(40020);"Bytes"
 160 PRINT:PRINT"Address From Which Written :";PEEK(400
21)+256*PEEK(40022)
 170 PRINT:PRINT"First Block ? : ";:IF PEEK(40023)=0 TH
EN PRINT"No."ELSE PRINT"Yes."
 180 PRINT:PRINT"Total Length Of File :";PEEK(40024)+25
6*PEEK(40025);"Bytes"
 190 PRINT:PRINT"Entry Address : ";:a=PEEK(40026)+256*P
EEK(40027):IF a THEN PRINT a ELSE PRINT"N/A"
 200 LOCATE 1,25
 210 PRINT"Continue...?":k$="":WHILE k$="":k$=INKEY$:WE
ND:CLS:IF LOWER$(k$)<>"n"THEN 60
 220 END
```

(continued on facing page)

which does not give the user a prompt to press Play on the tape recorder, it is a good idea to the cassette installed in the datacorder and to have Play depressed before running the program though this is not essential. The actual machine code routine is as follows:

Hex.	Mnemonic	Comments.
3E 2C	LA A, &2C	; loads the parameters
21 40 9C	LD HL, &9C40	; for the routine into
11 40 00	LD DE, &0040	; A, HL, and DE.
CD A1 BC	CALL &BCA1	; calls the Rom routine
D8	RET C	; returns to Basic if OK
C6 FD	ADD A,&FD	; generates an error byte
32 5E 9C	LD (&9C5E),A	; which is placed in &9c5e
C9	RET	; returns to Basic

The Basic program then checks by Peeking location 40030 whether the routine called has been successful or whether an error has occurred. It also checks whether the user hit the Escape key during the Rom routine which halts its action, and acts accordingly.

If the routine has run correctly then the program interprets the data stored at locations 40000 to 40063. In fact only the locations from 40000 to 40027 contain useful information, although the bytes in the header stored from 4028 to 40063 can contain useful information when the file is not created by Basic tape commands. In any case, whatever information this may be, it cannot be interpreted in terms such as block number or similar in the same way as the other bytes. Indeed, the information stored here is likely to have a unique purpose for every program in which they are used at all.

The program displays the information under the headings Filename, Block Number, File type, Length of Data in Block, Address from which the file was written, Total length of file, the Entry Address in the case of machine code programs, and also says whether the block being read is the first or the last block or not and whether or not the program is protected.

Once the information has been displayed, the program pauses and asks whether the user wishes to continue to read another header. Any key other than n is taken to mean yes, while if n is pressed, the program ends. Otherwise, the program repeats the process, searching for another header. The time between when the Continue . . .? message is displayed and when a key is pressed is a good time to change tapes, fast forward etc.

It would also probably be convenient, if the user owns a printer to change the appropriate Print statements to Print 8 statements to obtain a hard copy of the header information for later use.

I should be most happy to answer reader's inquiries about the program should any arise providing that the inquirer encloses an sae with any questions sent to me. I also am willing to provide a tape copy of this program to any reader if they send a blank tape and a cheque/PO for £1.00 inclusive of p&p to H.V. Smith, Upper Danyparc, Llandefalle, Brecon, Powys LD3 0UN.

```
230 REM machine code
240 MEMORY 39999
250 DATA 3e,2c,21,40,9c,11,40,0,cd,a1,bc,d8,c6,fd,32,5
e,9c,c9
260 FOR a=41000 TO 41017:READ b$:POKE a,VAL("&"+b$):NE
XT
270 RETURN
```

Spectrum tape back-up. Idea by J.Evans

```
 1 REM Code by D.Brankin
10 FOR n=USR "a" TO USR "a"+8
20 READ a: POKE n,a: NEXT n
30 DATA 243,14,254,237,120,237,121,24,250
40 RANDOMIZE USR USR "a"
```

Tape back-up

David Brankin,
Thornbury,
Bristol.

Spectrum

I HAVE CREATED the ultimate tape back-up program for the ZX Spectrum. It is very reliable and can copy any program. It can even copy music. It can back-up any length program — 1000000K + — and only takes up nine bytes.

It works by taking in a signal from the mic and putting it out the ear to another tape recorder. The only disadvantage of this system is that you have to pull the plug upon finishing. Note that the border doesn't change colour.

Teeth Eater

Paul Kinnaird,
Belfast.

Vic-20

THIS GAME is for the unexpanded Vic-20. It loads in two parts. Part 1 pokes the graphics into the memory, prints up the name of the game, Teeth Eater, and automatically loads the main game — part 2 — using a short machine-code routine.

You are a toothpaste tube and you must stop the bacteria from eating away at the teeth. You may move left and right by using the keys Z and X and you may shoot using the spacebar. You have one minute to hit as many bacteria as possible. For each bacteria you hit you get 100 points. A high score is kept and displayed at the end of each game. If the bacteria gets to the toothpaste tube you will be contaminated and the game will be over.

```
200 FORT=0TO95:READA:POKE7168+T,
A:NEXT
300 DATA254,254,254,254,254,254,
254,254
310 DATA127,127,127,127,127,127,
127,127
320 DATA31,63,127,255,255,255,25
5,255
330 DATA240,248,252,254,254,254,
254,254
340 DATA255,255,255,255,255,255,
255,255
350 DATA255,255,255,255,255,127,
63,31
360 DATA254,254,254,254,254,252,
248,240
370 DATA255,126,126,126,94,94,94
,94
380 DATA94,94,94,94,126,60,24,24

390 DATA126,219,255,255,195,126,
36,102
400 DATA24,0,24,0,24,60,60,24
410 DATA145,82,0,0,214,0,82,145
500 POKE36879,8:PRINT"■"
510 PRINT"■■■
```

(continued from previous page)

```
190 FORT=15TO0STEP-.05:POKEV,T:N
EXT
195 POKEV,15:POKES1,0:POKES2,0:P
OKES3,0
200 POKES6879,10
210 PRINT"[VS]";
215 FORT=1TO4:POKE36869,255
220 PRINT"DDDDD@DDDD@DDDD@DDDDD@
";
225 NEXT
230 PRINT"EDDDDFEDDDFEDDDFEDDDDF
"
240 PRINT"[GGGGGGGGGGG]"
250 PRINT"BDDDDCBDDDCBDDDCBDDDDC
";
260 FORT=1TO4
270 PRINT"DDDDD@DDDD@DDDD@DDDDD@
";
280 NEXT
290 TI$="000000"
295 FORT=0TOVS:NEXT
300 IFG=7790THENG=7791:H=7813:G1
=38511:H1=38533
301 IFG=7811THENG=7810:H=7832:G1
=38530:H1=38550
302 POKEG,7:POKEH,8:POKEG1,5:POK
EH1,5
303 GOSUB1000
305 POKEG-1,32:POKEG+1,32:POKEH-
1,32:POKEH+1,32
310 GETA$
320 IFA$="Z"THENG=G-1:H=H-1:G1=G
1-1:H1=H1-1
330 IFA$="X"THENG=G+1:H=H+1:G1=G
1+1:H1=H1+1
348 REM ** MOVE BAC **
350 POKEA,9:POKEA1,6:POKEA+1,32
360 A=A-1:A1=A1-1:POKEV,0:POKEV,
15
365 FORT=0TOVS:NEXT
370 IFA=HTHEN700
410 IFA$=" "THEN430
420 GOTO300
430 R=H+22:R1=H+30720
431 POKES4,140:POKES3,140
440 POKER1,7:POKER,10
450 IFR>7855THENPOKER-22,32
460 R=R+22:R1=R1+22:POKER,10
470 IFR-1=ATHENPOKER,11:FORT=1TO
10:POKEA1,2:NEXT:POKEA1+1,32:SC=
SC+100:GOSUB600
490 IFR>8030THENPOKER,32:POKER-2
2,32:POKES4,0:POKES3,0:GOTO300
495 POKE198,0
500 GOTO440
600 PRINT"[SSSSSSSSSSSSSSSSSSSSSS
SSSS]SCORE:";SC;"[S]"
610 POKEA,32:POKEA1,0
620 A=8052:A1=38772:RETURN
700 PRINT"[L]":Q=36879:V=7:X=15:FO
RI=1TO30
710 FORT=VTOX:POKEQ,T::POKEQ,8:P
OKEV,T:POKES1,T+150:POKES3,T+150
:NEXT
720 PRINT"[R]        HARD LUCK
 [R]";
730 PRINT"[N]";
740 NEXT
750 PRINT"[SSSSSSSS]";
760 FORT=1TO2:PRINT"[RRRRR]
      [R]":NEXT
770 PRINT"[RRRR] THEY GOT YOU [R]"
780 FORT=1TO2:PRINT"[RRRRR]
      [R]":NEXT
790 FORT=15TO0STEP-.05:POKEV,T:N
EXT
800 IFSC>HSTHENHS=SC
810 PRINT"[VE]": POKE36869,240
820 PRINT"[GGGGG] ┌──────────────
──────┐"
830 PRINT" │                    │"
840 PRINT" │                    │"
850 PRINT" │     HIGH SCORE     │"
860 PRINT" │                    │"
870 PRINT" │                    │"
875 PRINT" │                    │"
880 PRINT" └────────────────────┘"
890 PRINT"[SSSSSSSSSSSSSSSSSSSSSS]"
;HS
900 GOSUB5000:GOTO60
1000 PRINT"[R]";TI$
1010 IFVAL(TI$)=100 THEN1100
1020 RETURN
1100 PRINT"[R]       TIME UP!!!
 [R]"
1110 FORT=1TO500:NEXT
1120 GOTO800
5000 FORT=1TO35
5010 READN6,L6
5020 POKES2,N6:POKES3,N6:FORP1=1
TOL6*211:NEXT
5030 POKES2,0:POKES3,0
5040 NEXT
5060 RESTORE
5070 RETURN
5100 DATA219,.5,223,.5,227,1,228
,2
5110 DATA219,.5,223,.5,227,1,228
,2
5120 DATA231,1,228,1,217,.5,217,
.5,219,1
5130 DATA231,2,228,.125,231,.125
,228,.125,227,.125,228,1
5140 DATA228,2,227,.125,228,.125
,227,.125,223,.125,227,1
5150 DATA227,2,223,.125,227,.125
,223,.125,219,.125,223,1
5160 DATA223,1,219,.5,217,.5,219
,2
```


RSD Connections Ltd

MONITOR LEADS

BBC to Microvitec	£2.20
TV to Computer	£1.25
Green to Screen	£2.95
BBC to Fidelity etc	£4.95
QL to Fidelity etc	£4.95
Commodore to Fidelity etc	£4.95
Phono to Phono	£1.25
BBC to Ferguson	£2.50
QL to Microvitec	£2.50
QL to mono monitor	£1.50
BBC to Sony/Kaga	£6.95
BNC to BNC	£2.95
Commodore to Ferguson	£2.50
BBC to Hitachi	£2.50
Sony to Fidelity etc	£6.50
MSX to Ferguson	£2.50
QL to Ferguson	£2.50

IDC AMPHENOL

36-way plug	£4.95
36-way socket	£5.95
36-way plug (solder type)	£4.95

DISK DRIVE LEADS

Dual disk drive power lead	£4.50
Dual disk drive lead 1m	£10.25
Single disk drive power lead	£2.75
Single disk drive lead 1m	£7.25
Disk drive extn lead 1m	£7.25

CASSETTE LEADS

BBC to cassette	£2.25
Dragon to cassette	£2.20
Spectrum to cassette	£1.25
BBC to Acorn cassette	£2.25

PRINTER LEADS

ALL 1 METRE LENGTH

BBC	£9.95
BBC serial	£8.95
AMSTRAD	£16.76
MEMOTECH	£12.75
LINSTEIN	£12.75
IBM PC	£16.75
SPECTRUM interface to RS 232	£9.75
ATARI	£15.25
ATARI	£133.95
APRICOT	£15.20
DRAGON	£9.95
QL	£10.75

ANY COMBINATION OF LEADS MADE TO ORDER

RIBBON CABLE (price per ft)

	Grey	Rainbow
9-way	£0.13	£0.24
10-way	£0.15	£0.28
14-way	£0.18	£0.32
15-way	£0.20	£0.36
16-way	£0.22	£0.40
20-way	£0.30	£0.50
24-way	£0.36	£0.60
25-way	£0.40	£0.65
26-way	£0.45	£0.70
34-way	£0.60	£0.80
37-way	£0.65	£0.85
50-way	£0.70	£0.90
50-way	£0.95	£1.25
60-way	£1.10	£1.40
64-way	£1.25	£1.50

EDGE CONNECTORS

2 x 23-way (ZX81)	£1.85
2 x 28-way (Spectrum)	£2.10

DOUBLE SIDED PLUG BOARD:

ZX 81 23-way	£1.25
Spectrum 28-way	£1.50

ADDITIONAL IDC 56-way Card Edge for Extension Lead £4.25

D CONNECTORS

Solder Bucket	Male	Female
9-way	£0.75	£1.00
15-way	£0.95	£1.50
25-way	£1.50	£1.90
37-way	£2.40	£3.25
HOODS £0.95		

TELEPHONE CONNS

Surface master jack socket	£3.75
Surface extn socket	£2.50
Dual outlet adaptor	£4.25
Line jack cord 3mtr	£1.85
4 core cable per metre	£0.48

All surface units shuttered BT approved.

CONNECTORS IDC

	Card Edge	Trans PCB	2 Row Socket
10-way	£1.20	£0.95	£0.80
14-way	–	–	£0.90
16-way	£1.60	£1.20	£1.00
20-way	£1.90	£1.35	£1.20
26-way	£2.40	£1.60	£1.45
34-way	£3.10	£1.95	£1.60
40-way	£3.40	£2.00	£1.85
50-way	£3.85	£2.25	£2.00
60-way	£4.80	£2.60	£2.25

SPECTRUM EX. LEADS

6 inch extensions calbe: M to F	£10.50
6 inch F to 2M's	£14.75
12 inch extension cable M to F	£10.75

IDC SHROUDED HEADERS WITH EJECTING LOCKING ARMS

	Straight	Right angle
10-way	£0.85	£0.90
14-way	£1.00	£1.20
16-way	£1.25	£1.45
20-way	£1.40	£1.60
26-way	£1.70	£1.95
34-way	£2.00	£2.30
40-way	£2.15	£2.45
50-way	£2.30	£2.65
60-way	£2.45	£2.85

BBC MONITOR STAND

Heavy-duty stand Vinyl covered in BBC colours to match ONLY £11.95

DISTRIBUTION SOCKET

4 WAY MAINS

4-way top quality mains trailing sockets. Supplied wired up with mains plug ready for use. Can be screwed to floor or wall if required. Very useful for tidying up all the mains leads from your peripherals. Allows the whole system to be switched on from one plug. ONLY £9.50

SPECTRUM DRIVES

RS232 WAFA lead 1m	£10.50
Centronics WAFA lead 1m	£10.50
Micro Extn. lead 12"	£6.00

IDC D CONNECTORS

	Male	Female
9-way	£2.70	£3.20
15-way	£3.20	£3.70
25-way	£3.80	£4.45
37-way	£5.90	£6.80

TRADE ENQUIRIES WELCOME

75p P&P IN U.K. Access & Visa accepted. Add 15% VAT to all orders

Cheques made payable to

RSD Connections Ltd, Dept YC6
PO Box 1, Ware, Herts.
Tel: 0920 5285

MAIL ORDER PROTECTION SCHEME

If you order goods from Mail Order advertisements in this magazine and pay by post in advance of delivery, *Your Computer* will consider you for compensation if the Advertiser should become insolvent or bankrupt, provided that:

(1) You have not received the goods or had your money returned; and

(2) You write to the Publisher of of *Your Computer* summarising the situation not earlier than 28 days from the day you sent your order and not later than two months from that day.

Please do not wait until the last moment to inform us. When you write, we will tell you how to make your claims and what evidence of payment is required.

We guarantee to meet claims from readers made in accordance with the above procedure as soon as possible after the Advertiser has been declared bankrupt or insolvent.

This guarantee covers only advance payment sent in direct response to an advertisement in this magazine not, for example, payment made in response to catalogues etc., received as a result of answering such advertisements. Classified advertisements are excluded.

A GREAT PACKAGE DEAL!

For serious users of the BBC Computer.
A professional trio which can be integrated to produce an information management system of exceptional power.

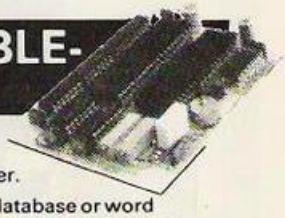
1 SCRIBE

THE PROFESSIONAL WORD PROCESSOR designed for the serious user ■ All operations fully prompted ■ No special knowledge of the computer system necessary ■ Document size NOT limited by computer memory ■ Automatic disc buffering ensures text is moved between disc and computer memory without user intervention ■ Up to 255 pages in a single document ■ 80 column display ■ on screen underline and right justify ■ See it as it will be printed.
SCRIBE comes in a chip with 5 minute fitting instructions, utilities disc and manual.
DISC MACHINES ONLY.
£59.95 + 60p p&p

2 DATABASE

A superb record keeping system with an incredible operating speed.
96 fields per record ■ One record 2 Kb max ■ One field 900 characters max ■ 4000 records per database ■ 16 level conditional search ■ Find any record in 2 secs ■ Wild card search ■ Record match ■ 8 automatic sub indexes ■ Total flexibility of output via report writer with auto write back to any field ■ Maths pack ■ Semi programming language.
Integrates with Scribe to give conditional search with MAIL MERGE and high powered report formatting.
Database is in a chip.
DISC MACHINES ONLY
£49.00 + 60p p&p.
Scribe & Database in one chip
£95.00 + 60p p&p.

3 DOUBLE-DOS



Double density disc interface for the BBC computer.

A high capacity database or word processor is enhanced even further with this state of the art disc interface.
The many features include ■ almost 800 Kb of CONTINUOUS file space on a standard 80 track disc drive ■ Automatically read standard Acorn files ■ Compensate for discs formatted in single density ■ Provide up to 159 files IN ONE DIRECTORY ■ Automatically read, write and format double sided drives to appear as one disc surface ■ Allow maximum use of **MERTEC** Scribe and Database.
Fitting to your computer is made exceptionally safe and reliable by providing connection via a flexible ribbon cable. Full instructions provided.
£109.25 + 90p p&p

NOW AVAILABLE IN ONE GREAT PACKAGE

DATASCRIBE IN A SINGLE CHIP!! — **£95** inc VAT

DATASCRIBE & DISK INTERFACE — **£195** inc VAT

Purchasers of MCP software are provided with a free update service and an unmatched level of technical support. (Updates subject to postal charge.)

Please supply the following products/information (Delete as applicable).
QTY ☐ _____
QTY ☐ _____
QTY ☐ _____
In enclose £ _____ Inc P&P My Credit Card No. is _____
Visa ☐ Access ☐ Tick which
Name _____
Address _____

To: **MERLIN COMPUTER PRODUCTS,**
33/36 Singleton Street, Swansea SA1 3QN. Telephone: 0792 467980

Mertec

MERLIN COMPUTER PRODUCTS

IMPORTANT NOTE:
Please check with us if you decide to use any other disc interface than Acorn or Double-Dos with Scribe or Database.

THE ELECTRONICS MAGAZINE PROFESSIONALS CAN'T RESIST.

Electronics and Wireless World is the only electronics magazine to really tempt the professionals.

It's the only one they take the trouble to pick up for themselves.

That's because it's written for the engineer who sees electronics not only as a job, but also as a hobby.

It's written on a technical level that doesn't talk down to you.

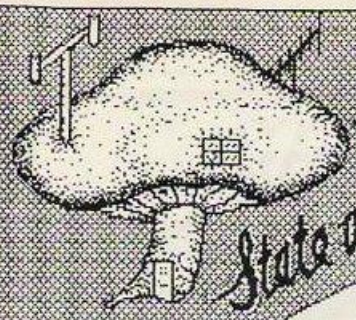
It keeps you up to date with all the latest products and processes, applications and equipment.

And it covers every industry where electronics is involved.

Just one look at the new look magazine and you'll see why it gets professionals like you out of the office, and down to the newsagents.

ELECTRONICS & Wireless world

The leading magazine for electronics engineers.



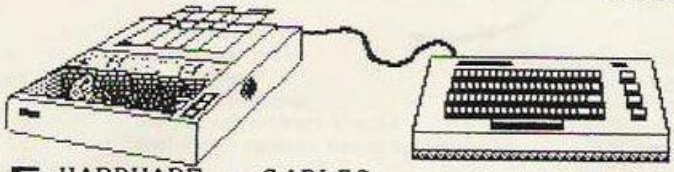
State of the Art Software

This whole page was printed in just one run using the special commands contained in the latest and most sophisticated printer utility ever written for the Commodore 64!

NOW, YOU CAN BE THE MASTER OF YOUR PRINTER WITH,

CENTIPEDE

The Advanced Commodore 64 – CENTRONICS Interface / Printer Utility



COMPATABLE

HARDWARE – *CABLES*
The printer is connected to the 64 via the user port.. Pins A to N are used- (PA2 to strobe and FLG to Acknowledge. A proper shielded multi-core cable is supplied (if needed) rather than ribbon. It works fine with 'EASY SCRIPT'.

SOFTWARE – *This program is fitted a disposable Auto-Relocater which enables it to Co-exist with most other utilities. You can, if desired, specify an address on loading. Another feature to put you in control!*

IF YOU ALREADY HAVE A CABLE – WE CAN ADVISE YOU ON ITS SUITABILITY – YOU NEED ONLY PURCHASE THE SOFTWARE.

THIS PROGRAM HAS BEEN TESTED WITH BOTH DOT MATRIX AND DAISY WHEEL TYPE PRINTERS WITH EXCELLENT RESULTS

VERSATILE

As stated at the top of the page, this whole page was printed out in just one run and not just 'stuck together' for the benefit of this advert
Proof of what is possible when using 'CENTIPEDE'. So far I have mixed Hires with the printers' own font. There's more:-

Above.. I have taken a piece of Hires screen, and by using a simple FOR-NEXT loop, have dumped it here using each of the modes available on my printer. I even have a choice of 4 ROTATIONS! (The 4th can be for shading !. The rotation can be used in both low and hi-res and, can be either a whole screen or just one character square. There are over 20 commands, and 255 secondary addresses, giving the user plenty of freedom to make his printer perform whatever tricks it was designed to. (and perhaps a few the makers hadn't thought about !).
The writer has even made some amendments to the operating system of the 64. Just to make life a little easier. You can print.. "CBM{rvs}{yel} Control codes" Or maybe... "CBM{clr}{rvs}{yel}>>> Control codes"
Or if you're just not in the mood for opening and closing files, then you can use the '**' command which does it all for you!! Generally, the use of ESC codes has been cut to the minimum so you may enjoy using your printer to the maximum. Of course, you can still use this utility as though the extra features didn't exist.. We don't want to change tradition ...too much. Whichever way you want to use your printer. You'll find the way with 'CENTIPEDE'.

USE THIS UTILITY TO DUMP PICTURES FROM 'DOODLE' & 'KOALA PAD', *for just:*

£11:50 £9:50

Multi-Core cable + £10 *EXTRA* **ALL INC!**

OR CHECK OUT ONE OF OUR PRINTER OFFERS :- AND GET CENTIPEDE FREE!

THE PRINTER USED FOR THIS PRINTOUT IS, WE THINK, THE ULTIMATE MACHINE. HIGH SPEED (120 cps), LTR QUALITY, OVER 70 ESC CODES.
ITS CALLED THE *Sakata* SP-1200 PLUS AND COST JUST £292 INC. CENTIPEDE & CABLE

PHONE OR WRITE FOR PRICES ON, EPSON [*Full range available*]
Some other makes of printers we have to offer. (Prices inclusive – *except delivery*)

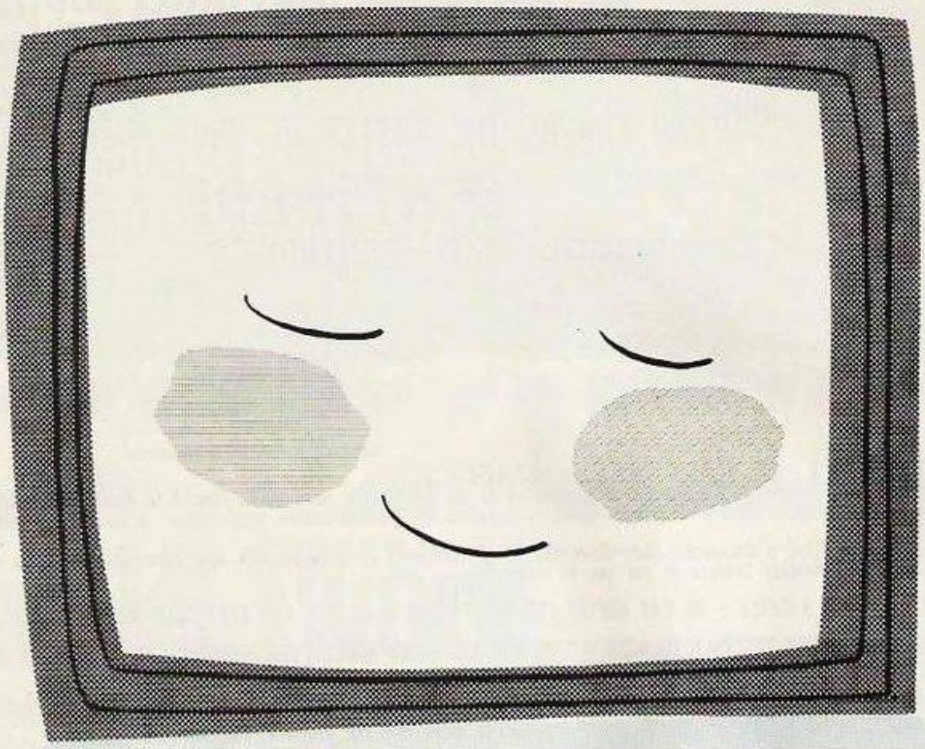
Tideo LTR-1 PRINTER £160 INCLUSIVE LIMITED PERIOD LQ
MANNESMANN TALLY MT80 £217 + Full range available
RITEMAN Printers from £249

WE HAVE MANY MORE PRINTER OFFERS – WRITE OR PHONE , NOW! – *AND CHECK OUT OUR EXPANDING SOFTWARE RANGE*

MUSHROOM SOFTWARE

MUSHROOM SOFTWARE is marketed by :-
KEYPLAN COMPUTERS LTD
193 ROMMANY ROAD, LONDON SE27 9PR
01-670 3533

Has anyone ever told you...



...YOU HAVE A WONDERFUL PROFILE!

Readership Profile, that is. It's the jargon we use to describe you — the buyers and readers of Your Computer — to other people, such as Advertisers. And we probably know more about you than you think! For instance: 65% of you are under 24. 34% of you are considering buying a new computer — even though an overwhelming 96% of you already own one. On average, you each spent £376 last year on computers, software and add-ons, and during the next 12 months 75% of you intend buying more software, with 72% buying other add-ons. And that's not all There are well over 130,000 of you buying Your Computer every month — making it the biggest selling home computer magazine in Britain. Which is good news for our Advertisers as it gives them the lowest cost per thousand of any magazine in the computer market — just £7.39. No wonder they love your profile as much as we do!

YOUR COMPUTER

Britain's biggest selling home computer magazine.

YOUR COMPUTER CLASSIFIED

01-661 3036

Contact: Susan Platts

ADVERTISEMENT RATES

Copy Date June 25

RATES QUOTED BELOW ARE SUBJECT TO THE ADDITION OF 15% VAT.

Lineage: 50p per word (Min 20 words)
Box No: £4.00 extra
Linage advertisements are prepayable and the order form published in this section should be completed and returned with remittance. Credit Card facilities are available.

Display — rates per scc (Min. 2scc)

One insertion	:	£9.00
Three insertions	:	£8.70
Six insertions	:	£8.50
Twelve insertions	:	£8.00

Display advertisers should preferably reserve space by phone.

Closing date for Classified advertisements is the 25th June for the August issue.

Post to
Your Computer, Classified Department, Room H211, Quadrant House, The Quadrant, Sutton, Surrey SM2 5AS.

Britain's Biggest Selling Home Computer Magazine

VDU BLUES — V2U

Fatique, allergies, depression, headaches etc. maybe increased by long exposures to CRT emissions.
A negative air ioniser could alleviate such side effects by precipitating positive electro static charges.
For literature on ionisers from £26.04.
Please contact: **Surplusvalue, Beehive Workers Cooperative Ltd., 40a High Street, Stockport, SK1 1EG. Tel. 061 483 9436.**

INCEDIBLE VALUE copying program for the Amstrad CPC 464. Features include seven save speeds. Price includes first class P&P. Send cheques/PO for £3.50 to: Brian J. Mackenzie, 23 Etherley Close, Newton Hall, Durham DH2 5QX.

WDSoftware

FOR THE QL

WD Utilities (3rd ed) (base £5.50)
PRINT 60 file DIRectory or view it on one screen, one key LOAD, COPY or PRINT 60 files with one key (allows for namesakes). Multiple FORMATing to prevent corruption by stretching of tape. TOOLkit to give dated, numbered modules in program development. PRUNE old files to release space (one key DELETEs a file). Full instructions in QUILL file. Use up to 6 EXTRA MICRODRIVES (add on your Spectrum ones)!

WD Utilities for CST Q-Discs (base £8)
100-file capacity, for CST/Computamate disc systems AND up to 4 extra microdrives. User-friendly timesavers.

RefQL (3rd ed) (base £3)
500 useful QL references in an ARCHIVE file (too long for one cartridge with Utilities *and* Morse).

FOR SPECTRUM/QL/BBC

WD Morse Tutor (base £4)
From absolute beginnewr to beyond RYA and Amateur Radio receiving. Adjust pitch. Set speed to your test level (4.18 wpm). Learn from single characters, via groups with wide spaces to random sentences; decrease spacing to normal. Write down what you hear, then CHECK on Screen or Printer (or speech for Spectrum with Currah Microspeech). Also own message, random figures, letters or mixed.

FOR SPECTRUM 48K

Tradewind (base £4)
Sailing/trading strategy game with graphic surprises.

Jersey Quest (base £4)
Text adventure with Bergerac and the Dragon. (not disc)

PRICES (incl Europe postage — elsewhere add £1)
Spectrum/BBC Cassettes — base price only
QL or Spectrum Microdrives — £2/cartridge plus base price
5.25" floppies £2 plus base (SPDOS) format for Spectrum)

Two or more programs on one medium — pay medium + base. E.g. WD Utilities and RefQL for £10.00, but IMPOSSIBLE to mix QL/BBC/Spectrum programs on one medium. Send YOUR cartridge and base price, but FORMAT it FIRST in your DRIVE 1 for compatibility.

WDSoftware (YC),
Hilltop, St Mary, Jersey.
Tel. (0534) 81392

ORIC 1 & ORIC ATMOS SOFTWARE OVER 100 TITLES AVAILABLE

ALL AT DISCOUNT PRICES (All ATMOS compatible) e.g.
£4.50 Killaven, Encounter, Krillys, Oric Munch, Super Advanced Breakout
£4.95 Arena 3000, Skramble, Show Jumping
£5.50 Cribbage, Frigate Comm, Super Fruit
£5.95 Chess II, Digger, Hamer Attack, Helion Defence Force, M.A.R.C. Land of Illusion, Mr Wimpy, Panic, Rat Splat, Scuba Dive, Spooky Mansion, Ultima Zone, Trouble in Store
£6.50 Attack of Cybermen, Backgammon, Draughts Cheat, Gobbler, Gravitor, Probe 3, Quark-A-Jack Trickshot, Zebble, Zoolympics
£6.95 Categorie, Classic Racing, Football Manager, Lane Raider, Manic Miner, Space Shuttle, World Geography, 4 Games for Children
£7.50 Bamburber, Diabolical Tower, Fireflash, Don't Press Letter Q, Styx, Trans At 1, Xenon 1, Zargons Revenge
ATMOS Dust Covers (Black/Red Piping) £2.95
Many other programs available. (Bus/Utilities)

CH/PO'S TO **O. J. SOFTWARE**
273 Mossy Lea Rd, Wrightington, Wigan, Lancs. WN6 9RN
PRICES INCL U.K. P&P; Europe + 50p, Others + £1
Tel. (0257) 421915
Write or phone for free list

MAGIC-MESSAGE PLUS

This tape lets you do remarkable things with programs. Such as:

- Reveals and lets you change Hidden basic in "machine-code" programs. (Even the Basic messages in the Sinclair ROM will be revealed). Could reveal clues in some games. Just for fun, a game was changed to say; Written by Orsen Cart!!
- Puts Headers on Headerless-Files ready to Load into Magic Message or make them ready to transfer to a Disc/Wafa/Microdrive.
- Makes FALSE headers for any progs (so will STOP the UNSTOPPABLES).

Load MAGIC-MESSAGE, play in program and like Magic messages will appear on video for you to read/change.

Post £5.95 Free

O/seas, Europe + 55p, Others + £1.55
(Please order as Magic M)

ZX-GUARANTEED (Dept YC)
29 Chadderton Drive, Unsworth, Bury, Lancs. BL9 8NL

ATARI HARDWARE

Atari 800 XL + Atari 1050 disk drive
£239.95

Atari 800XL	£79.95
Atari 1050	£179.95

All prices include VAT
p&p is free in UK

Please send cheques/PO's to:

SJB Disk Supplies (Dept YCO)
11 Oundle Drive
Wollaton Park
Nottingham
NG8 1BN
Tel: (0602) 782310

☆ UNLOCK YOUR AMSTRAD ☆ with AMSKEY

Easy to use, utility program removes protection and allows listing, studying and copying of your precious software. You choose, loading speed and protection of your back-up copies. Fully automatic, header reader with on-screen instructions and prompts.
FREE PEAK A CODE PROGRAMME. Allows you to find the messages and words in your machine code games (very useful for adventures).

Only £6.99 including p&p
Overseas orders please add £1 postage

Interlock Services Ltd.
Dept YC
37B New Cavendish St.
London W1M 8JR.
Tel: 01-609 8301

614

TAPE COPIER 7.

NEW

Yes it can be done! Make security BACK-UP copies of the MAJORITY of your SPECTRUM programs including HIGH SPEED loaders, and JERKY leaders with TC7. A good "clean" copy which will hopefully suit your system. Other methods have proved limited.
★ includes BAUD RATE (speed) measurer.
★ can save high speed/jerky parts in "normal" form for DRIVE transfer.
★ so many extra features we can't possibly list them here. Just try it and see. As the market leader we can't afford to let you down.
COST ONLY £6.50 (or £7.50 with MT6 — see below)

MD1b/WD1b for TAPE TO DRIVE TRANSFER

NEW

You now have a CHEAP but FLEXIBLE means of transfering your programs with our information sheets and software (not limited to a small list). Get much satisfaction and learn at the same time.
To transfer most programs to MICRO/WAFA/DISC drive you MUST have this program. It gives you the tools to convert programs so that they will run on your drive. Includes ability to cope with v. long programs, can split/chop bytes in one go, "VAL" creator, REMkill, make Visible, etc, etc. Full manual with example transfers. (also need TC7 for latest programs).
MD1b (WD1b for disc or Wafadrive owners) costs a mere £6.99.
EXTRA program to CONVENIENTLY transfer converted bytes directly to m/drive with many other features (e.g. alter program names, stop programs, etc) buy MT6 at £3. (Wafadrive version is called WAFATAPE at £4).

LERM INFORMATION SHEETS

NEW

Each sheet gives you the DETAILS required to transfer a selected number of the more difficult POPULAR programs. £2 + SAE. Up to sheet 2 available.
UPDATE SERVICE: for latest version on your LERM product send old tape + large SAE to get a £2 REDUCTION. **OVERSEAS:** add £1 Europe, £2 others for each product. **SAE for enquiries.**
ALL PROGRAMS CARRY OUR MONEY BACK GUARANTEE (not updates)
LERM, DEPT YC, 10 BRUNSWICK GDNS, CORBY, NORTHANTS.

FAST COMPUTER REPAIRS

VIDEO VAULT INTERNATIONAL 10★ REPAIR SERVICE

Spectrums repaired for £19.95 inc. Parts, Insurance and P & P No Hidden Extras. BBC, Commodore 64, Vic 20, Atari, Quoted for.
Are you fed up with waiting weeks for your Home Computer to be repaired!!! Why not try the Experts, we offer a full repair service on any Home Computer. All repairs carry a full 3 months guarantee, plus on every Spectrum repaired we send you a free game worth £5.95 for your enjoyment and pleasure.

- ★ **While you wait Service by Professional Computer Engineers.**
- ★ **3 Months written guarantee on all repairs.**
- ★ **International repair company.**
- ★ **All computers sent by mail order turned around in 24 hrs.**
- ★ **Most Spectrums repaired within 45 minutes.**
- ★ **All Micros insured for return journey.**
- ★ **Open 7 days a week.**
- ★ **School repairs undertaken-discounts available.**
- ★ **Free software with each Spectrum repaired worth £5.95.**
- ★ **Over 8 years experience working with computers.**

ONLY GENUINE SINCLAIR PARTS USED.
Phone today for your free estimate or send your computer to us with £1.75 (UK EIRE I.O.M. C.I.) or £6.50 (Europe/Scandinavia) we will contact you the same day by phone or 1st class Mail should you require quotation first.
TRADE ENQUIRIES MOST WELCOME. ACCESS WELCOMED
VIDEO VAULT LTD, Dept R22, THE LOGICAL CHOICE

VideoVault

FREE GAME WORTH £5.95 WITH EACH SPECTRUM REPAIR.

Telephone: Glossop (STD 04574) 66555.
140 High St. West, Glossop, Derbyshire, England.

FREE TEACH YOURSELF MACHINE CODE LESSONS

With the ROYBOT 48K Spectrum Machine Code System. Simply type in instructions, dynamic displays show CPU/memory internal working. System comprises full scale ASSEMBLER, DIS-ASSEMBLER, DEBUGGER, TESTER, ON-LINE LEARNING AID with advanced easy to use facilities. Options include using printer, microdrive, hex or decimal numbers.

Cassette £7.95, Cartridge £9.75, Overseas + £1.00

Roybot Dept YC3, 45 Hullbridge Road, Rayleigh, Essex SS6 9NL. Tel: 0268 771663 for leaflets.

NEW

TAPE – Commodore 64 – DISK

SUPER-BREAKER

ALL THIS IS ONE GREAT DISK

1. TURBO BREAKER II: Now transfers many more turbo's to disk than before e.g., Novaloads, Pavloaders, Pavloaders with pictures, Flashload, Hyperload, CBS, Ariola, Burner, Micro Power, Adventure Inter, and lots more.

2. TRANSFER II: To transfer those slow load games to disk.

3. SUPER DISKOPY: Now copy from Disk to Disk in only 3 MINS on one disk drive, copies protected commercial disk with error tracks.

4. TURBO MENU MAKER: This is a selective menu maker that also saves a disk turbo with the file, so now you only include the file names you wish and then turbo load them from the disk.

YOU GET ALL THIS ON ONE SUPER DISK FOR ONLY £22.00 INCLUDING P & P

SUPPLIED SEPERATELY:

TURBO BREAKER II ONLY	£12.95	TURBO MENU MAKER ONLY	£10.95
SUPER DISKOPY ONLY	£10.95	TRANSFER II ONLY	£ 8.00

ARROW FILE: Now you can store all your software records in order. List them all or by letter, print them out in double column. This program can be used to make lists of books etc., Only £10.95 Disk.

DISK DOCTOR: A full disk editor, recover a scratched file, edit any block, amend any track, list any track. Only £8.00 Tape.

TURBO SAVER: Make easy back up copies at turbo speed from your slow load programs, multi parts etc., easy to use. £8.00 Tape.

DISKOPY: A selective disk copier to transfer only the files you wish from disk to disk, very easy to use. £7.00 Tape.

ARROW MICRO SERVICES
20 Portmeadow Walk: London S.E.2

COMMODORE

SUPER BREAKER BACK-UP BOARD FOR THE COMMODORE 64 AND VIC-20

★ NEW DESIGN ★ LOW COST BOARD ★ NEW DESIGN ★ LOW COST BOARD ★

When a second CBM type cassette unit is connected to this board it will make back-up copies of cassette based software, including turbo/fast loaders, machine code and/or basic and data files. Very user friendly, the back-up copy is made on the second cassette unit while the original is loading on the first. No additional software is needed. Priced at £8.95 plus 55p for p.p. U.K. (Europe add £1.00, elsewhere add £2.00). Send cheque/postal order, or a stamp for full details, to:

C. KENT, 26 North Cape Walk, Danesholme, Corby, Northants, NN18 9DQ

For enquiries ring (0536) 742622 between 3pm and 5pm

COMMODORE

THE PROFESSIONAL MACRO ASSEMBLER PACKAGE FOR THE COMMODORE 64 (TM)

Assembler: Lets you create, maintain and assemble source code program files. ONLY £11.95
Disassembler: Lets you disassemble object program code either from memory or directly from disk. ONLY £10.50
Disk Monitor: Read, edit and write blocks from/to disk. Will also let you issue disk commands (copy file, scratch file and so on). ONLY £9.25
Machine Code Monitor: All the usual functions (hunt, fill, transfer, load, save etc.) ONLY £7.65

UNBEATABLE OFFER . . . BUY THE WHOLE PACKAGE FOR ONLY £22.95

ALL programs are supplied on disk for 1 or 2 1541 disk drives.
Include £3.50 p&p with your order.

ORDER FORM

Name: .....

Address: .....

.....

.....

Assembler ☐ Disassembler ☐ Disk Monitor ☐ Monitor ☐
For 1 Disk Drive ☐ For 2 Disk Drives ☐

Payment on cheque only. Make payable to: LBS SOFTWARE

Send order to: LBS SOFTWARE, GLENTEVEJ 11, DK-3650 OLSTYKKE, DENMARK.

Please allow up to 6 weeks for delivery because of postal delays.

64-3

SINCLAIR QL
Only £379.99
QL COLOUR MONITOR
Only £255.95
COMMODORE SX-64 PORTABLE
(Disk Drive & Col. Monitor Built in) only £795.95
PHILIPS 12" Green Monitor (Composite video & Sound) £85.95
SINCLAIR FLAT SCREEN TV £99.95

All prices include VAT & Fast Free Delivery (UK only)
Please send cheques/PO's to: COMPUTER PLUS
45 Bridge Street, Newcastle, Staffs. ST5 1RT.
Tel. 0782 622333

"BATTLEFRONT", the ULTIMATE EPIC IN WAR STRATEGY GAMES for the CP 464. Covers all modern conventional warfare. Includes fighters, bombers, paratroops, tanks, artillery, scouts, ground to air missiles and the ability to select forces and change scenarios. Only £8.95 Cheques/P.O. to **Z. Karim Software, 60 Helena Road, London E13 0DU.**

* BACK-UP-SYSTEMS * * FOR CBM-64 & VIC-20 *

By Turbotronic (formally (Halifax))

The BACK-UP-BOARD Mk 1 is the fastest, and easiest way to back up your tape programs. With this board you can connect CBM cassette deck to your computer. You can copy a program on the second deck while it loads from the first. You can back up all fastg loaders, data files, etc. BACK-UP-BOARD Mk 1 £10.00 inc., p&p.

NEW! BACK-UP-BOARD Mk.2 NEW!

This new version of our famous BACK-UP-BOARD now works two ways. Switched to 'NORMAL' it operates as the Mk.1. Switched to 'GENERATE', '64' owners can use our special transfer software to regenerate a copy of a program on the second deck as it loads from the first. This method can produce a better quality copy than the original. BACK-UP-BOARD Mk.2 & software £14.50 inc. p&p. Conversion service. Return your Back-up-Board, if purchased from us, to be modified to Mk.2 for £4.550 incl. software and p&p.

AZIMUTH HEAD ALIGNMENT TAPE BY INTERCEPTOR

Use this tape with your '64' to adjust the heads of your decks to make a perfectly matched pair. Full instructions and screwdriver supplied. £9.50 inc. p&p.

ROM SWITCH/RESET BOARD

Fit this board in the expansion port of your '64' and you can reset ALL programs. Resets programs that a standard reset switch can't. A socket for a 2764 8K eprom is also fitted. Full instructions supplied. £10.00 ionc p&p.

Send your cheque/PO to:
TURBOTRONIC
46 Ripon Street, Parkinson Lane, HALIFAX, West Yorkshire HX1 3UG

'IMAGE' V.2 – FOR THE ELECTRON/BBC

'Image' was the ultimate tape back-up copier, now it's even better

You can be completely assured that this is one of the best and most able program of its type available. It can deal with:

- Locked programs
- Programs of any length
- 300 and 1200 BAUD
- Files
- ?'s (Ctrl codes) in filename
- Multiple copies
- False or trick block info.
- Changing Filename
- Continuous data streams
- Locking and unlocking programs

It is VERY IMPORTANT INDEED purchasers take note that **'IMAGE'** is for sale strictly for making **BACK-UPS** of your own software for your own use, for protecting your own programs, or as an aid to putting software on disk. Any person found using the program for illegal purposes runs the risk of being prosecuted.

To receive your copy of 'Image', send a cheque or P.O. to the sum of **An Astounding £4.80** to:

PETER DONN, Dept. (YC), 33 Little Gaynes Lane, Upminster, Essex RM14 2JR.

Please state BBC or Electron version.
V.1 owners can obtain V.2 by sending £1.50 + V.1 without case.

STOP – REVEAL

A unique cassette for the 48K Spectrum. Genuinely lets you:
1. STOP virtually all programs, BASIC, MACHINE-CODE and even HEADERLESS-FILES, protected or not.
2. REVEALs the hidden Basic in Machine-Code programs. (Could be clues in adventure games).
3. LISTS actual Machine-Code on your video.
Now you can STOP, LIST, MODIFY, STUDY most Spectrum programs at your leisure. (And cassette is Microdrive compatible).
Includes a DISSASSEMBLER so can even study Sinclair ROM, etc, plus the most Advanced HEADER-READER ever written, plus pages of SECRETS OF THE TRADE explaining professional methods used to hide lines/programs, etc.
YOU CANNOT GET A MORE POWERFUL CASSETTE
(Even STOPS/REVEALS programs which are a genuine 48K long).
POST £5.95 FREE
(Europe add £1. Other areas add £2)
KERR, 1-2 HIGH STREET, KING'S LYNN, PE30 1BX. 332

IMPROVE YOUR PROSPECTS

with skills that employers want — learn the easy way with modern home study courses from Ideal Schools.

MODERN ELECTRONICS
Train for success in the fastest ever growing industrial sector.

COMPUTER PROGRAMMING
The demand for Programmers is increasing constantly — don't miss out!
For free booklet write today to

IDEAL

IDEAL SCHOOLS
(Ref. YC12)
60 St. Enoch Sq
Glasgow G1 UK.
Tel: 041-248 5200

6 NEW GAMES FOR THE SPECTRUM

Turtle Panic, Malibu (Surfer), Nudge (Fruits), MX Attack, Over The Jumps, Morse Systems. + Copyco & Examiner Prog. +
£5.00 each
PO/Cheque to: GDP (Software)
Dept YC1 "Freepost" Brampton, Chesterfield, Derbys. S40 3BR.
+ NEW GAMES ALWAYS WANTED +

DUBROVNIK FOR LONDON

I want to spend 30 days in July in London. For this you spend rest in Dubrovnik. I am 28 young man. Inq. Elektrotechnics, Tel. 050-24-229.

PAREZANIN SLAVKO
M. Marorice 19
50000 Dubrovnik
Yugoslavia.

617

ZX SPECTRUM. Machine code programs, can be easily copied. Not to be used on copyright software. Fast, easy only £3 + £1 P&P. Tel: Newry 4598.

FREE MEMBERSHIP SOFTWARE HIRE

• VIC-20 • COMMODORE 64 • • SPECTRUM •

SAE FOR YOUR HIRE KIT

VSH (YC), PO BOX 65, NOTTINGHAM NG1.

PLEASE STATE MICRO

AMSTRAD

COPY TAPE V2.0

AMSTRAD
THE ONLY SERIOUS AMSTRAD COPIER
COPY TAPE V2.0

- Copies more than any other copier
- The only one that copies headerless programs
- Choice of 10 fast reliable speeds
- Removes protection
- Integral header reader
- Easy to use, full instructions

THE ONLY ONE THAT WORKS
Only 6.99 on tape or £13.99 on disc.

SIREN SOFTWARE Dept YC
76 Bridge St., Manchester M3 2RJ

AMSTRAD

ASTROLOGY for beginners only £11.50

A Starter Pack comprising a simple program to calculate a horoscope, an introductory booklet & 2 self-teaching programs (how to interpret the horoscope).

No previous knowledge required

48K Spectrum, BBC/Electron, 48K Oric, Dragon, Tandy Color, Tandy TRS80, Commodore 64/PET, Atari, Amstrad, Sharp MX80A/K/700, Colour Genie, Video Genie/System 80/PMC 80
many more programs for experienced astrologers
also other micros
Dez programmas zijn thans in Nederlandstalige versies verkrijgbaar voor Spectrum. Vraag Documentatie!
Cash with order (add 50p outside UK)
or large sae for the free catalogue to:

ASTROCALC (Dept YC)
67 Peascroft Road
Hemel Hempstead,
Herts HP3 8ER
Tel: 0442 51809

537

HELP needed in packaging and mailing hardware and software overseas. Please write to Corso Serra Barrio Sanatorio, Nueva Helvecia, Uruguay. 702

BLANK CASSETTES

WITH LIBRARY CASES

	C10	C15	C20	C30
10	3.65	3.85	4.00	4.00
50	14.00	14.15	14.30	14.30
100	25.00	26.00	27.00	27.00

Fully inclusive (COD 65p extra)
Superior Tapes. Don't Settle for Less!

* * *

5¼" DS/DD DISKS
10 for £13.00 fully inc.
10 for £13.50 inc. Plastic Case

* * *

RING US NOW! (0793) 695034
UK HOME COMPUTERS (Dept YC)
82 CHURCHWARD AVE.
SWINDON, WILTS SN2 1NH

ZX SPECTRUM REPAIRS

CHECK THESE FACTS
1. FAST RELIABLE SERVICE
2. QUALIFIED STAFF
3. 3 MONTH GUARANTEE
+ + FREE POSTER + +
Send your machine only
Plus a cheque/PO for £19.95

To: MICROTRIX
24 Gt. Moor St. Bolton, BL1 1NP
Tel. 0204 398176

BLANK DISKS

SJB SUPER SAVERS
5¼" blank disk
(bulk packed by memorex)
10 single side/double density
£12.95
including free plastic case
10 double side/double density
£16.95
including free plastic case
50 ss/dd in a perspex storage box
£59.95
50 ss/dd in a perspex storage box
£79.95

All prices include VAT
p&p is free in UK
Please send cheques/PO to:
SJB DISK SUPPLIES
(Dept YCO)
11 Oundle Drive
Wollaton Park
Nottingham
NG8 1BN
Tel: (0602) 782310

POWERFUL UTILITIES

AMSTRAD — SPEEDMASTER FAST LOAD UTILITY

SPEEDMASTER is a tape copier with a **difference.** It allows you to save the copy at **a choice of three speeds**, normal, fast or very fast. Also incorporates a **header reader** and **deprotect basic** option. Continuous load and save. Tests have proved **100% successful**. An **invaluable** piece of software.
ONLY £7.95
Tape to disc utility due shortly.

TAPE COPIERS

Unique machine code programs to allow security back-up copies of the majority of protected software.
Available for:

Commodore 64 (normal speed load only)	£5.95
VIC 20 (All memory sizes)	£5.95
Spectrum	£5.95
Electron	£5.95
Atari (All models)	£5.95
BBC (handles locked files)	£5.95

All with full instructions

TAPE TO DISC UTILITIES

BBC
A **very useful** utility to help shift those stubborn tape programs onto **your own discs** **ONLY £9.95**
ATARI
A dual purpose program that allows single stage boot programs to be shifted onto disc. Includes output to tape. Works on **all models**.
ONLY £9.95

COMMODORE 64

THE BEST RANGE OF UTILITIES FOR THE 64. WRITTEN BY PROFESSIONALS—SOLD BY PROFESSIONALS

DISC DISECTOR V2.0

At last a **really powerful** disc copier and utility program. Incorporates a range of powerful programs. Includes "**Fastcopy**". Takes just **4 minutes** to read and write a **whole disc**. "**Error Copy**" automatically reads and writes **all** error types, now you can make a security back up of those expensive business programs. "**Quickdisc**" more than **halves** disc loading time, **very** useful. "**File Copier**" allows **selective** copying from directory. "**Track and Sector**" a slower but very thorough program. Also includes the following useful utilities: **Viewbam, Fast Format, Unscratch, Disc Monitor, Menu Maker, Index, Retitle, Rename, Scratcher, Disc to Tape** and **Tidy**. If you have a 1541 you **must** have Disc Disector. Supplied on disc with full instructions.
ONLY £29.95

QUICKDISC

Incorporating Menu Maker
NOW EVEN FASTER
Speed up your 1541 disc drive with this **new** program. Loads most programs at **4 times** normal speed. A flexible package that allows you to incorporate a **menu and fast loading** on **your own discs**. Also includes a file exchange for programs, put on disc with "**Disco**" (**THE** tape to disc utility), another way of making fast load disc programs. A **must** for all disc drive users.
ONLY £11.95

FASTBACK

Fast Load Utility
Convert your slow loading software to **high speed load** with Fastback. The **most sophisticated** program of its type allows you to produce "**turbo**" loading versions of most single and **multipart** software that load **independantly** of Fastback. **Simple** to use **no programming skill needed**. Example: Load "The Hobbit" or "Manic Miner" in **150 secs**. Tried and trusted lower 2000 sold!
A very professional program.
ONLY £9.95

DISCO

THE TAPE TO DISC UTILITY
We **guarantee** that this is the **best** tape to disc utility on the market.
Very easy to use no programming knowledge needed
Automatically handles device numbers and multi part programs. Programs **auto load** and **run** once transferred and can also be made to **fastload** with **Quickdisc**. Handy for making your own disc programs auto run.
ONLY £9.95

DOUBLER

Tape Back Up Device

Includes **hardware and software**. This **amazing** new cassette port adaptor allows you to make back up copies of "**turbo**" **software**. Tests have proved **100% successful**. Requires access to two cassette decks. The special software generates a **brand new machine copy** onto one deck while loading from the other. **Fast and reliable**, they said it couldn't be done.
ONLY £12.95

SPECTRUM

Yes, after spectacular success on the 64 Doubler is now available for the **Spectrum**. Tests have proved **100% successful**.
ONLY £12.95
PATENT APPLIED FOR

ROCKET

Fed up waiting for programs to load and save? Rocket is a utility for the programmer, speeds up loading and saving by about **8 times** while still allowing for normal speed operations. **Does not** affect the speed of BASIC as no wedge is used. Programs can also be saved with high speed system to **reload independantly**. A must for serious programmers who have no disc drive.
ONLY £7.95

BIGMOUTH

The **superb** new **speech synthesis** program for the 64. Uses "speak" as a basic command. **Very easy to use**. Can be incorporated into your basic programs. Words are entered in phonetic English, ie. spelt as they sound. Therefore vocabulary is **unlimited**. **Great fun** and good for educational purposes.
ONLY £7.95

COMMODORE CONNEXION

Connect **any** Centronics type printer to your 64. Price includes lead and software on cassette **with** special disc/cassette program.
Simple to use and very reasonably priced
ONLY £14.95

3M SCOTCH DISCS

Lifetime guarantee Box of Ten
SS/DD **£16.00** DS/DD **£23.00**

DATA RECORDER

A **dedicated** data recorder designed for use on the C64 or VIC 20. Specification is C2N but **with pause button**. Made available for the BBC or 16/48 since 1984.
SATISFACTION GUARANTEED.
ONLY £29.95

All prices include P&P and VAT. Send cheque, Postal Order or Credit Card No. Credit Card orders accepted by phone. Callers welcome. Wide range of goods stocked. Trade enquiries welcome. European orders send price as advertised. Outside Europe £2.00 for airmail. Mail order to Evesham Shop please.

MICRO CENTRE
BRIDGE STREET, EVESHAM, WORCESTERSHIRE
Tel: 0386 49641

MICRO CENTRE
1756 PERSHORE ROAD, COTTERIDGE, BIRMINGHAM.
Tel: 021-458 4564

SPECTRUM KOPYCAT Version 3

Simply the best. Copying any 16/48K Spectrum program is now as easy as LOADing and SAVEing your own programs.
Even unstoppable programs can now be backed up on to a fresh tape.

NEW FEATURES
" Continuous LOADing — Multipart programs copies in one go "
"65400+ byte programs backed up easily "
" Repeat Copies "
" plus much, much more. "
For 16/48K Spectrum only £4.95

MICRODRIVE KOPYCAT

Transfer your cassette software onto Microdrive simply and easily.
" Automatically relocates machine code programs "
" Stops and reveals BASIC programs "
ESSENTIAL UTILITY FOR MICRODRIVE TRANSFER
For 16/48K Spectrum only £4.95
Both programs include FREE Header Reader program.
Despatched by First Class return of post.

MEDSOFT
Dept YC, PO Box 84, Basingstoke, Hampshire, RG25 2LW.

637

- MAXAM -
FOR THE AMSTRAD

THE COMPLETE CODE DEVELOPMENT SYSTEM FOR THE AMSTRAD CPC 464.
★ ASSEMBLER ★ MONITOR ★ TEXT EDITOR ★

"The Arnor system is the best editor/assembler to be released for the AMSTAD so far" - PCN 100
"For flexibility and ease of use, ARNOR is easily the best I have seen" Pop. C. Wkly Vol 4 No 8
"assemblers.... look no further, ARNOR's is the best I have seen... by far the easiest to use and most friendly I have come across"
- Computing with the Amstrad. April 1985.

Now available in **ALL THREE** formats

Tape (only) £13.50
Disc £26.90.
16K ROM + multifunction adaptor £59.90
(All prices include VAT, p & p)

Cheques/POs to ARNOR Ltd Dept YC
PO Box 619, London SE25 6JL
-Overseas - no extra - Trade enq's welcome -

Make MAXimum use of your AMstrad

Hotline 01.653.1483 **Technical 01.852.2174**

AMSTRAD 464

BINARY BANANA

MAGIC PEN
Fill or sketch and save to file.
Loaders allow position anywhere on screen, even half on. Loaders included £4.95

SYMBOL 464
Re-design your character set the easy way save to tape and/or Binary readout £3.95

BIG LETTERS
Can produce very large letters, pictures etc., with symbol 464 or standard a.s.c.i.i. character set. Loader program included £3.95.

LITTLE LETTERS
Ten to a file 9 colours in a sixteen by sixteen pixcel letter or small picture, than enlarge X2-X4 loader programs supplied £3.50

THE ARTIST
Over 20 functions plus airbrush and Binary screen dump to tape. Includes text for titles etc. loader loads on screen while cassette runs £4.95.

DETAILS
Add a disk facility to your cassette system with this unique program. Now you can use C-60's or 90's. How did you ever manage without it? £2.95

Trade & expart enquiries welcome.

Binary Banana c/o Pi Tec Ltd.
Park Crescent, Peterborough PE1 4BG.

DUST COVERS SETS FOR AMSTRAD CPC 464/664 £6.95

*Matching proofed nylon, treated with anti-static inhibitor. Green/Blue piping on monitor cover; AMSTRAD CPC on keyboard cover.
*Please state model, colour or mono.

Cover for Tatung-Einstein £7.50
Proofed pale grey nylon piped in black with name on keyboard.

Cover for other computers
Matching proofed nylon with toning piping and name on keyboard: BBC, DRAGON, £4.95, COMMODORE, GOLDSTAR, SANYO, SONY, TOSHIBA £3.95. In black but unpiped: SPECTRUM plus £2.50, QL £2.95.

Matching covers for Printers
Amstrad DMP-1, Canon PW 1080A, Commodore MPS 801, Epson FX-80, RX-80, Mannesmann MT-80, Panther DX 109 Shinwa CP-80, CPA-80, Seikosha 500, Taxan KP810 £3.95, Brother HR5 £3.50 and Juki 6100 at £4.50.
*48 Hour Turn-Round 1st Class Postage.
ALSO AVAILABLE: Monitor, disc drives etc. and good range of Business Computer covers eg IBM-PC, Apricot, Macintosh, Olivettt M-24.

BBD COMPUTER DUST COVERS
39 MANSE AVENUE
WRIGHTINGTON WN6 9RP
Telephone 0257-422968

TRADE ENQUIRIES WELCOME

SINCLAIR Service Centre

We have the spares for all repairs to: Spectrum, ZX81, Interface 1, Microdrive, Ram Pack.
You pay £10.00 and parts and return postage. All units repaired to the original standard using genuine Sinclair spares by our HNC qualified staff.
Also available Spectrum memory update 16K-48K fitted by us £28.50.
Quantum, 33 City Arcade, Coventry (0203) 24632

SUPERIOR SPECTRUM TAPE COPIER

The NEW 007 SPY is the ONLY copier capable of copying even a full 48K Headerless program.

* Copies multipart programs all in one Loading, automatically.
* Copies programs from 1 to 65279 bytes long. (Can yours?
* Copies Headerless files upto a full 48K. (No other copier can).
* Copies ALL types, Basic, Code, Screen, Arrays, Headerless.
* Guaranteed easiest to use.
* Supplies with FREE sheets which cover several Hyper-Load games. (Sold separately for £2).

007 SPY IS JUST £3.95
O/seas, Europe +55p, Others +£1.55
(Please order as 007N)

ZX-GUARANTTED (Dept YC)
29 Chadderton Drive, Unsworth, Bury, Lancs. BL9 8NL
Tel: 061-766 5712

HOME ACCOUNTS. Put your house in order! Probably the best home use for your computer! Comprehensive coverage of bank accounts, credit cards, HP, etc. Inbuilt accuracy check for all transactions. Project cashflow for any period ahead. Available for CBM 64 or VIC-20 £8.45 or free details from: DISCUS SOFTWARE, FREEPOST, Windmill Hill, Brixham TQ5 9BR. Tel: 08045 55532.
477

LEVEL 9 ADVENTURES
for 32K or bigger versions of
AMSTRAD BBC SPECTRUM
CBM64 MSX ENTERPRISE
MEMOTECH ATARI

Colossal Adventure, Adventure Quest, Dungeon Adventure, Snowball, Return to Eden, Lords of Time. All text adventures £2.95 cassette or (£11.95 disk BBC & CBM only) Also Emerald Isle – graphic adventure £6.95 cassette or (£8.95 disc BBC & CBM only)

QUAZAR COMPUTING
29 Western Road,
Newick, E. Sussex BN8 4LE.

MICRODRIVE-WAFADRIVE TRANSFER TAPES

Transfer majority of your games to WAFADRIVE or MICRODRIVE using the 007WD or 007MD tapes. These use the Semi-Automatic method proved to be the MOST successful available. Includes transferring of Headerless programs & programs in map area.

NOTE: The 007 programs do NOT just copy a few listed programs but copy so many that it is not possible to list them all. For absolute maximum transfer ability Newsletter Club covers the difficult, longer & the Hyper-Load programs. Includes:
VU-FILE, HOBBIT, SCRABBLE, ALIEN 8, DECATHLON, BRIDGEPLAYER, etc., etc.

007WD or 007MD on cassette.....£5.95
0M7MD on CARTRIDGE.....£7.95

O/seas, Europe +55p, Others +£1.55

MICRODRIVE/WAFADRIVE EXCHANGE CLUBS
Membership is just £6 for 12 issues (£9 Europe, £12 elsewhere).

ZX-GUARANTEED (Dept YC)
29 Chadderton Drive, Unsworth, Bury, Lancs, BL9 8NL
Tel: 061-766 5712

MULTI-CHOP PLUS BYTE-COUNTER

A suite of 6 extremely useful and easy to use programs which let you chop programs into 2 or more parts ready for transferring onto either Microdrive, Wafadrive or Discdrive or simply use to chop off Screen so programs load faster.

Your programs can be split into:
1. Just the first 6912 (Screen).
2. All except first 6912.
3. First 4000 + Remainder.
4. 4000 + Remainder less screen.
5. Can reduce Super long programs upto 65279 Bytes down to size.

Has been used to successfully put MONTY-MOLE & POGO on Microdrive.

Includes a Header-Reader and Byte counter which can even give the length of Headerless-Files.

POST £5.95 FREE
O/seas, Europe +55p, Others +£1.55
(Please order as MULTI-CHOP)

ZX-GUARANTEED (Dept YC)
29 Chadderton Drive, Unsworth, Bury, Lancs. BL9 8NL

Spectrum Repairs

£16.95 inclusive of labour, parts, p&p etc. ZX81 for £11. Fast reliable service. (Av. repair 24 hrs) by qualified engineers. Send computer only to:
HS COMPUTER SERVICES
2 The Orchard, Warton, Preston, Lancs. PR4 1BE. Tel. 0772 632686 or 634897

ATARI 400/600/800/800XL

Tape to Disk Utility.
Transfer single AND multi-stage "boot" tapes to disk and then run them from a fast, autoload menu. The only one that can handle up to five stages. £12.95 inc.

Tape Copier.
Easily duplicate single and multi-stage, M/C, BASIC, even non-standard format tapes. Option to save copies at faster baud rates. £6.95 inc.
Cheques/PO to C. Gibbons, 170 Bradwell Common Boulevard, Milton Keynes, Bucks MK13 8BG.

TECTEL ROBOTICS
CONTROL BOARDS FOR HOME COMPUTERS

ORIC
ORIC DUUBRY £24
1 of 16 channel controller
ORIC ADC £34
Superfast 8 channel analog – digital scanner, 8 bit resolution.
ORIC I/O port £39
16 programmable channels
ORIC PRINTER £95
26 col, matrix, graphics double sized print, ink & ribbons.

ZX81
ZX81 DUUBRY £22.50
1 of 16 channel controller
SX81 ADC £34
Superfast 8 channel analog – digital scanner, 8 bit resolution.
ZX81 I/O port £34
16 programmable channels
ZX81 HI-RESOLUTION GRAPHICS £28
stunning results.

ITEXT SOFTWARE a new range of educational programs.

TODDLERS (pre school)
LEARN your ALPHABET
LEARN to COUNT
LEARN your COLOURS
LEARN your SHAPES
ABOUT the HOUSE
ABOUT the KITCHEN
ABOUT CLOTHES
£3.95 each

MUMS & DADS
ITEXT cookbook (English)
ITEXT cookbook (Chinese)
ITEXT cookbook (Italian)
ITEXT cookbook (Indian)
ITEXT Wine & Beer Making
ITEXT Cookbook Desserts
ITEXT Cookbook Confection
£5.65 each

Send cheque or Postal Order to:

TECTEL
Telford Opportunities Centre, Halesfield 14, Telford, Shropshire.
Tel. 0952-581738

P&P £1.50 for control boards £1 for tapes

COMPUTER REPAIR CENTRE
Have you got problems with your computer?
THEN CALL US
BBC, Spectrum, CBM, Dragon
Mail order or call in
ENFIELD COMMUNICATIONS LTD
135 High St, Ponders End, Enfield, Middx.
01-805 7772

PREMIER LEAGUE
48K SPECTRUM
New and exciting football management strategy game. For all enthusiasts. Features include: Team Selection, Training, Substitutes — plus many many more. Send SAE for details or only £4.75 to: Dept B. E. & J. Software, 59 Stainton Rd., Enfield, Middlesex.

COMMODORE 64 £120
TOSHIBA HX10 MSX £190
BOTH NEW AND BOXED
01-952 0687

NOTICE TO ADVERTISERS
VALUE ADDED TAX
Would classified advertiser's please note that 15% Value Added Tax must be added to advertisement rates quoted in this Journal.

ATARI 400/600/800/XL
Cartridge Transfer System

Transfer your cartridges to tape or disc. Simply plug the supplied cartridge simulator board into the cartridge socket and load in the tape/disc copy as you would any other program. 48K RAM minimum required, specify tape or disc version. No modifications to your computer required.

Original 400/800 system £15.00
NEW 600/800XL version £25.00

Tape to Disc transfer utility

DOS based single stage tape to disc transfer utility.

Tape to disc £6.50

Tape Duplicator

Duplicate almost all of your BASIC/machine code tapes whether they are single or multi-stage. 48K RAM recommended.
Tape Duplicator £6.00

Fast Loader

Reduce tape loading time by re-recording almost all of your single/multi-stage BASIC/machine code tapes at a faster data rate (up to 49% faster).
Fast Loader £6.00

Prices include p&p. Send SAE for further details of these and other utilities.

S. Terrell, 17 Cock Close Road, Yaxley, Peterborough PE7 3HJ.

The Publishers take all reasonable care to ensure that classified advertisements are genuine, but readers must satisfy themselves that they will be obtaining what they require before entering into transactions, particularly if they involve large sums of money.

128/128

COMMODORE 64 — AMSTRAD — ATARI — MSX OWNERS
MIDLAND COMPUTER LIBRARY

All the latest titles on cassette, disc and cartridge.
2 Hire your first game absolutely free. Up to £1.75.
3 Life membership £6.00.
4 Hire charge from only £1.25 p&p for full 7 days.
5 No limit to the amount of games you can hire.
6 All games originals with full documentation.
7 Games, Business and Educational software.
8 Return of post service.
9 Lowest new hard and software prices in the UK.
10 Join now on 14 day money back guarantee.
11 Over 1,200 games in stock inc. many UK imports.

Send cheque or postal order for £6 with your one selection or large SAE for further details, stating machine to:

MIDLAND COMPUTER LIBRARY
28 College Street
Worcester WR1 2SL
Tel: Worcester 611072

TASCOUNT
routines for
Tasword Two and Pageword

Fast machine code counts words, edits HELP pages and double space lines. Also pages text and adds headers and/or footers with or without page numbers. Insets blocks within existing text. Easily merged with all Tasword variants. £5.95. SAE for details.

Pageword enhancement for Tasword Two £9.99.

Reform Software
4 Evelegh Road, Farlington, Hants PO6 1DL.

AMSCLUB
AMSTRAD USER CLUB
Attention Arnold users!
Join the biggest independent club for the CPC 464!
Look what we have to offer
Bi-monthly tape magazine
Software/Hardware discounts from our special supplier news, reviews, programs
Exchange Club, Pen Pal Club
International Membership
Competitions and much more
One years membership £3
(£5 overseas)
Send cheques/P.O./Eurocheques
TO: **AMSCLUB**
42 Mount Stewart Street
Carluke, Strathclyde, Scotland

AMSTRAD CPC 464 cassette utility. Backs up all programs tested up to 84K long. Choice of 4 save speeds, and special quick save format. Includes header reader and transfer to disc instructions. Introductory offer, only £4.50. Cheques or PO's to: C. Jones, 64 Richmond Road, Leicester.

AMSDISK
Tape to Disk for only £5.95
AMSCOPY II
Tape to Tape
best available — only £4.95
AMSNOHEADER
Deals with headerless files — excellent program only £4.95
DEEP THOUGHT
Fastest & best assembler available for Amstrad CPC 464
Beats competition easily — £8.95
ULTRATEC (Computing)
Dept (YC), 49 Primate Road, Plains Farm, Sunderland SR3 1RP
Trade & Overseas orders welcome
Tel: (0783) 283550
Overseas please add £1
We take pride in our utilities

SELL IT WITH YOUR COMPUTER

CLASSIFIED ORDER FORM

Classified Rates

Lineage: 50p per word (Min 20 words) — prepayable

Lineage advertisers should complete the form provided in BLOCK CAPITALS. Phone number counts as 2 words. Name and address to be paid for if used in advertisement. Box Number if required is £4.00 extra.

Display — rates per scc (Min 2scc)

One insertion	:	£9.00
Three insertions	:	£8.70
Six insertions	:	£8.50
Twelve insertions	:	£8.00

Display advertisers should provide separate copy and preferably reserve space by phone (01-661 3036).

Method of Payment

Cheques etc. should be made payable to Business Press International Ltd, and crossed. I enclose herewith cheque/PO for

£.....

Please debit my Access/Visa Barclay Card/American Express/Diners Club Int/ /as below

SIGNATURE

Post to:
Cut out the order form and return together with your remittance to: Classified Department, Your Computer, Room H211, Quadrant House, The Quadrant, Sutton, Surrey SM2 5AS. (01) 661 3036

Please insert the following advertisement in Your Computer Classified Section

						LINAGE	PLUS 15% VAT	TOTAL
						£10.00	£1.50	£11.50
						£12.50	£1.87	£14.37
						£15.00	£2.25	£17.25
						£17.50	£2.63	£20.13
						£20.00	£3.00	£23.00
						£22.50	£3.38	£25.88
						£25.00	£3.75	£28.75

No. of insertions required ☐ Box No. required YES/NO

NAME *(Please include initials).* .....

ADDRESS .....

.....

.....

Payment by credit card please state address card is registered

Daytime tel. no .....

THIS FORM SHOULD BE RETURNED BY JUNE 25 FOR AUGUST ISSUE

Company Registered Number: 151537 (England) Registered Office: Quadrant House, The Quadrant, Sutton, Surrey SM2 5AS.

Hot★ lines

Acorn Computers
Telephone: Cambridge 0223 210111

Atari
Telephone: Slough 0753 24561

Amstrad
Telephone: Brentwood 0277 228888

Commodore CBM
Telephone: Northampton 0536 205252

Enterprise
Telephone: 01-739 4282

Sinclair
Telephone: Camberley 0276 685311

Tandy Corporation
Telephone: Birmingham 021 5566101 ext 33

Toshiba
Telephone: Camberley 0276 62222

DATEBASE

Local, national and international micro events are updated here.

IBM PC Users Show

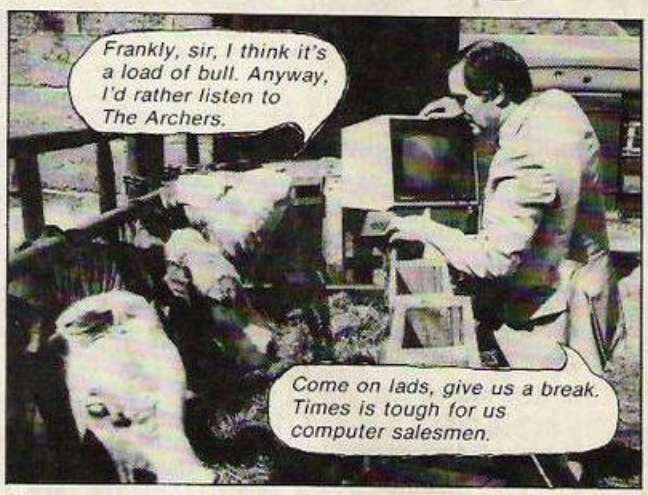
Open to the general public so at least you can wander in and familiarise yourself with Big Blue.

The exhibition takes place at Olympia 2 from July 2-4. More information available from EMAP Business and Computer Publications on 01-837 3694.

Making Music

Be warned, some days are trade only so check with the organisers before you wander in and check out all the new chip and computer-assisted ways of making music.

The event more properly known as the British Music Fair takes place from July 30-August 4 (first three days trade only) at Olympia 2. Organised by Philbeach Events, London. Telephone 01-385 1200.



Quanta Learning Systems of Guildford has been awarded a contract by ICI to produce the training manual for the recently launched Agviser Information Service. The guide is for use by British Farmers and Agricultural Merchants who have access to the service.

Using a pictorial step-by-step approach, which won Quanta the 1985 RITA Award for the best users' training manual of the year, the guide is designed to build up the confidence of users in simple stages and to provide an "easy-to-use" reference to operating the system.

"Hooves-on" experience for Quanta's chief executive Tony Jones as he researches the Agviser Training Manual down on the farm.

EXPORT

AND OVERSEAS VISITORS

ALL MAKES OF MICRO COMPUTERS, PRINTERS, PERIPHERALS AND SOFTWARE SUPPLIED AT DISCOUNT PRICES.

AMSTRAD • ORIC • SINCLAIR • BBC MICRO • ELECTRON • COMMODORE • AQUARIUS • EPSON • BROTHER AND ALL POPULAR MAKES.

MICROGOLD

UNICOM HOUSE
182 ROYAL COLLEGE STREET,
LONDON NW1 9NN
TELEX: 295931 UNICOM G
TELEPHONE: 01-482 1711

INDEX OF ADVERTISERS

A
Addictive Games 78
Amstrad 62, 63
Anthoney Ashpital 87

B
Beebug 46
Betasoft 22
Bondwell 66

C
Caldew 94

D
Dean Electronics 87
Dennison Manufacturing Co. 6

E
E.I. Systems 102
Elite Systems 5
English Computer Shop 84

H
Hi-Soft 38

I
IDS 46
Imagine IBC
Industrial Process 84
Interface 22
ITS 46

K
Keyplan Computers 115
Kuma Computers 39

L
LCL 22
LMT 14

M
Memorex 44, 45
Microgold 122
Micro X 14
Mirrorsoft 100

N
New Generation Software 18, 54

O
Ocean Software 32, OBC
Odin Computer Graphics 26
Opus Supplies 91, 94

P
Phillips & Phillips 20
Picturesque 87
P.V. Tubes 84

Q
Quicksilva 4

R
Ram Electronics 98
Railway Magazine 84
Romantic Robot 14
RSD Connections 94

S
Saga Systems 28
Silica Shop 51
Spectrum 6, 7, 8, 9
Swanley Electronics 22
Swescot 102

T
The Micro Workshop 102
Thoughts & Crosses 10, 11

U
Ultimate Play the Game 30
U.S. Gold IFC, 24, 34, 75

V
Vector 80
Visionstore 43
Vortex Software 16

W
Walker Computer Systems 102

AMSTRAD £8·95
ZX SPECTRUM £7·95
COMMODORE 64 £8·95

HYPER SPORTS™

HYPER SPORTS

Konami®

Be only at your peak as you enter the HYPER SPORTS stadium to compete in six NEW exhausting events in this state of the art simulation – the officially endorsed version of the No.1 arcade game.

The screens above are taken from the Arcade version and may differ from the home computer versions.

Imagine
the name of the game

Continuing the challenge where 'Track and Field' left off.

Imagine Software is available from: WOOLWORTH, WHSMITH, John Menzies, Boots, LASKYS, Rumbelows, COMET, Spectrum Shops and all good dealers.

SPECTRUM 48K · COMMODORE 64

FRANKIE

GOES TO HOLLYWOOD

ONLY

9·95

Extraordinary Arcade Animation
An amazing journey to the centre of the Pleasuredome
Discover the secrets of the final screen!

FREE! FREE! FREE!

Unique LIVE recording of RELAX, never released in the U.K.
Exclusively from ocean in data-tune© twin cassette pack.

Ocean Software Limited
6 Central Street Manchester M2 5NS.
Telephone: 061 832 6633

Ocean Software is available from selected branches of:
WOOLWORTH, WHSMITH, John Menzies, Boots, LASKYS, Rumbelows, COMET, Spectrum Shops and all good software dealers.

ocean